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The Restoration of Fort Ticonderoga

Alfred C. Bossom, Architect

THE original fort at Ticonderoga was built on Fort Carillon, where the Iroquois Indians were when Champlain found them in 1609. He built a stockaded fort to control the passage of people from Canada down to New York, for this was the one point where the waters flowed both northward and southward. The sound of the waters gave the name of Carillon, as they could be distinctly heard in those days as they flowed from Lake George down into Lake Champlain. Lake George itself flows southward into the Hudson River, while Lake Champlain flows north into the St. Lawrence River.

A small tea-house overlooking Lake Champlain.

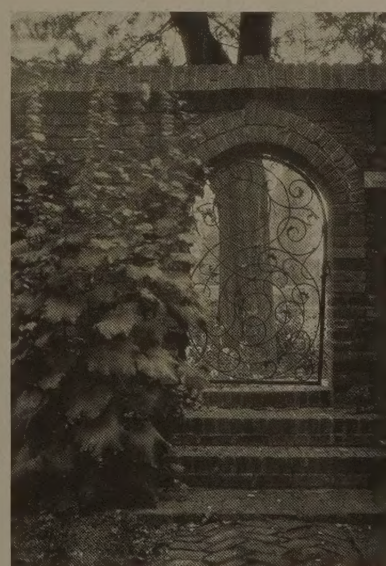
About one-third of the fort has been completely restored and is now used as a museum for objects relating only to this particular spot, and it is not intended that the entire fort shall ever be completely restored. The remainder, however, is to be preserved from further depredation or the effects of the elements. Below the fort walls is the old King's Garden, or "Le Jardin de Roi," in which the French officers undoubtedly used to promenade during the long intervals when they had no Indians or Americans or British to fight. This has also been restored in structural form to about what it was, and a lot of English hawthorn that was brought over by the British during their occupation has been collected about the property and replanted within its limits, making, with other plantings under the direction of Marion C. Coffin, an exceedingly attractive arrangement of landscape work. The endeavor is to maintain the old lines, which the plans that we have discovered showed originally existed.

The pavilion originally was a small house built at the end of the garden in the early part of the last century, and when it was decided in 1909 to start the restoration of the fort this was a ruin, the cows using the various rooms for stalls. It was about as far gone as anything could be, but was literally entirely remade and enlarged, preserving in every detail all of the character and interest that had accumulated there during the life of the building.

The Y–D House originally was built in the same form as the settlers built their log-cabins, under the protection of the fort. The trappers and huntsmen, who in the early days of the fort's existence gathered around it for trading purposes and protection, were not allowed within the walls, but had to build their homes between it and the waters of Lake Champlain in order to obtain protection from the fort's strong arm.

The Germain Redoubt is a relic of the French occupation, while the fort itself is much more a relic of the English, though the English developed it along the original Vauban lines.

This was originally constructed to protect the fort against surprise attack from the north. The embankments and ditch are exactly as they were built, and the redoubt itself was connected to the main fort by an embankment and ditch near the fort by a stone redoubt constructed under the orders of Monsieur Pont LeRoy. Beside this was a stone quarry. It may have been used as a protection for the quarry, for it was from here that the stone for the fort was obtained.



Iron gate leading to "Le Jardin de Roi."

The bridge and moat to the Germain redoubt. This was one of the outlying forts in connection with Ticonderoga during the French occupation, and formed the end of a great line of earthworks that extended practically across the promontory which was crowned by Fort Ticonderoga. This is now the possession of Major Howland Pell, who uses it as a summer residence.

The driveway into the fort around the corner of the southwest bastion. The battery of guns here shown were presented to the fort by the authorities in England, and are of the period when Ticonderoga was in its glory.

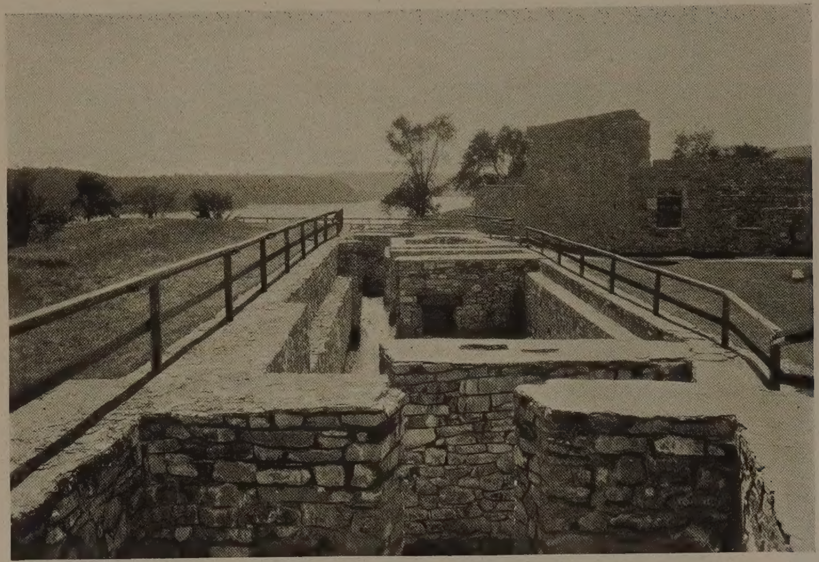
A view across the Place d'Armes at Fort Ticonderoga, showing the west barracks and the partially restored south barracks. It was in the room on the upper left-hand side of the west barracks where Ethan Allen demanded the surrender of Fort Ticonderoga in May, 1776 ("In the Name of the Great Jehovah and the Continental Congress"), from Captain de La Place.

The entrance-way to the Place d'Armes with the flags flying of the famous regiments that were there. The southwest bastion seen on the left-hand side of the picture.

Within the earthworks that formed the outer protection of the Germain redoubt, with the entrance to the drawbridge and moat on the left. The trees in the distance have all grown, of course, since the French evacuation, which gives some slight idea as to how long ago this was.

Corner of the "Le Jardin de Roi," showing a small summer-house. The walls around this garden were all built with rejected bricks from near-by brick-yards.

The log-cabin or "Y–D" House, built in the manner of the original homes of the settlers in this district, who used to build under the protection of the walls of Fort Ticonderoga.



View showing the method adopted to preserve the walls of the existing south barracks, so that the elements can do no further damage to this historic spot. At the same time it is not desired to entirely rebuild the fort and make it a modern reproduction of a great historic monument.

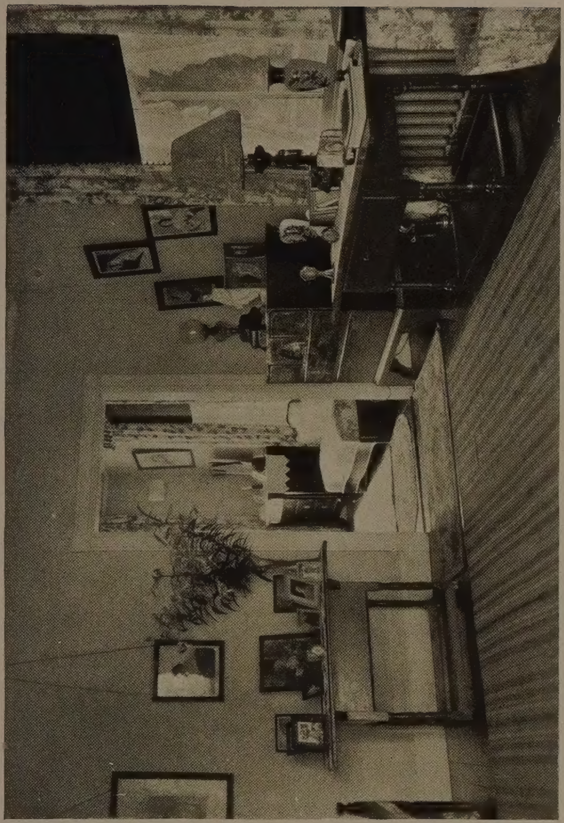
Portico of the pavilion which overlooks Lake Champlain. It is opposite this spot where General Champlain in 1609 landed and fought the Iroquois Indians, and thereby gave the name of Champlain to this great body of water. The illustration indicates the plan of the house, which has a high central section with two extending wings. The front of each wing takes the form of a long corridor against which all the rooms open, when the entire corridor faces the land.

Porch behind the sitting-room, which is like the prow of a boat driven into a mass of foliage.

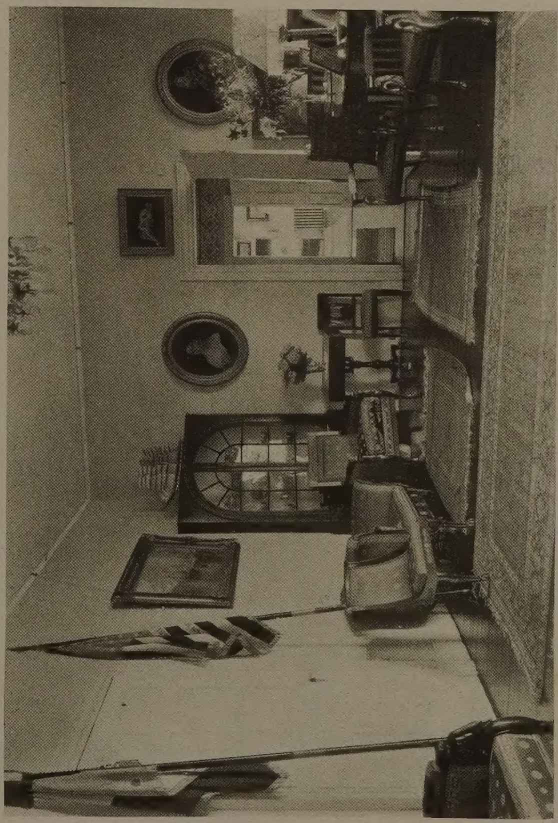
Rear view of the pavilion from "Le Jardin de Roi," the general treatment of this garden being the banking of flowers toward the house and a suppression and introduction of lawn and pool in the middle. Marian C. Coffin was the landscape architect.

Driveway to the rear of the pavilion, showing the low formation of the wings in contrast to the high central section.

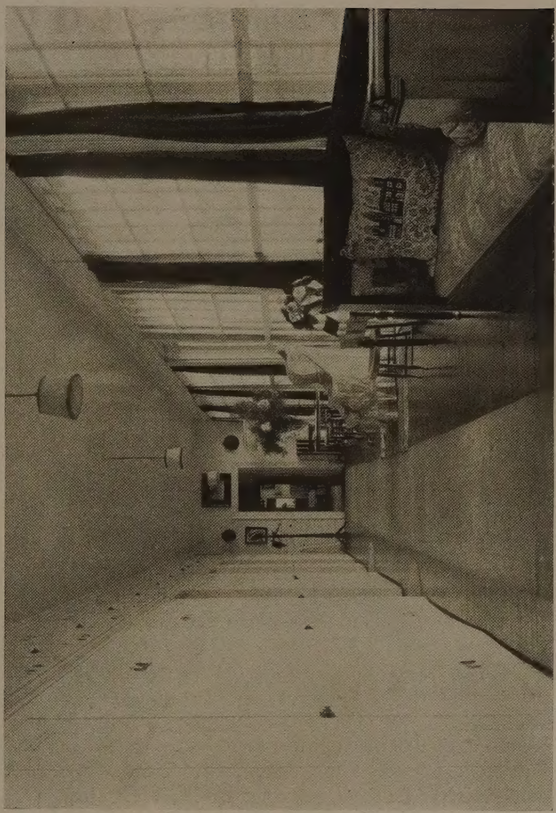
Dining-room of the pavilion. All the decorations in this room are made of old hand-blocked chintz fixed to the wall. The walls themselves are a very soft biscuit yellow.



One of the bedrooms in the pavilion.



The entrance-hall of the pavilion. The endeavor has been made throughout this entire house to furnish it in character with the great events and people that have been connected with Ticonderoga. The walls are lavender with white trim.



A corridor facing Lake Champlain, from which the bedrooms of the pavilion are entered.

Color in Architecture

"AMERICANS are continually criticised for their failure to respond to the artistic or beautiful," said a specialist and authority on color, recently.

"American temperament is supposed to be dominated by materialism and commercialism. How far the environments in which the great majority of Americans live have influenced their colorless temperaments may be judged when one pictures in the mind's eye the external atmosphere of a typical American city or town which, to even a tolerant observer, is drab, colorless and uninteresting. American 'Main Streets' are the cradles of American temperament.

"In every phase of modern life color now makes its appeal. Our books, periodicals, and advertising are all colorful. Our clothing, our vehicles, the theatre, and our shop-windows outdo one another in presenting to the mind a color picture. As life becomes more colorful in all its aspects, so the visible expression of that life—architecture—must become increasingly colorful, and architecture to-day is at the threshold of a color Renaissance.

"The possibilities of architectural color expression offered by reinforced concrete represents the simplest and more responsive avenue of approach. The colors suitable for the body of concrete structures are only limited by the artistic conception of the architect. There are no decidedly right or decidedly wrong colors. Each color is suitable to a particular architectural type, environment, texture of finish, and roof and trim color-scheme. The scope of selection is an inspiration in itself. Then, too, concrete color stain is a permanent stain and architects need not fear the havoc, to their color selection, of sun and weather.

"Colored concrete is not limited to urban cottages, but has even a greater service to offer to residences and buildings in congested cities. In the country, trees, sky, flowers, and shrubs offer colorful backgrounds, but in the city, where the great majority of our population is located, the majority of waking hours are spent amid the grayed and dingy backgrounds of the city streets.

"Residential blocks of variegated colored concrete, far from being an eyesore, can be made a source of exquisite delight. In a run-down, dilapidated neighborhood, only a few blocks away from the busiest business corner in New York City, a group of artists a few years ago purchased two rows of houses on two adjacent streets, with backyards adjoining. They remodelled the exteriors of the old structures with concrete and tinted the back walls of the houses in a charming array of soft blues, stone pinks, gray greens, and warm buffs. The back fences were removed and a community garden took the place of the individual backyards.

"The selection of the color for the concrete depends on the architectural type of the house, its surroundings and the roof and trim color-scheme which is to be used with it. Warm cream and fawn are always a dependable selection. With the cream, several excellent color-schemes readily present themselves.

"A brown roof can be used with green trim; a green roof with brown trim; or a red roof with white trim.

"Lichen green, terra-cotta red, stone pink, sage-green, Venetian orange, all offer interesting and practical possibilities for stucco houses. Each color, of course, demands artistic discernment in the selection of the other colors to be used with it.

"The coloring of the walls becomes the problem of the architect and builder as well as the decorator."

Zoning Laws Have Proved Their Great Value

A STEADY growth in the realization by property-owners that the Zoning Ordinance of New York City is a measure designed to protect their interests is evidenced by the gradual increase in the number of strengthening amendments to the zoning maps made by the Board of Estimate. In 1916, when the Zoning Ordinance became a law, the Board of Estimate was given the power to make needed changes in the restrictions imposed by the ordinance, after having held a public hearing on each question of raising or strengthening restrictions.

In the year 1923 alone there were 81 such changes to the zoning maps of the city. Of the 81 changes, 62—or 77 per cent of the changes—were the result of petitions by property-owners that restrictions in their districts be strengthened. The increase in the number of strengthening changes made by the board is clearly shown by the following figures for the years 1917 to 1923:

Year 1917—	Strengthening	changes	16%	of	total	changes.
Year 1918—	"	"	23%	"	"	"
Year 1919—	"	"	35%	"	"	"
Year 1920—	"	"	56%	"	"	"
Year 1921—	"	"	61%	"	"	"
Year 1922—	"	"	77%	"	"	"
Year 1923—	"	"	77%	"	"	"

These figures are made public in a report entitled "Zoning Practice in the New York Region," by Edward M. Bassett, prepared for and published by the Regional Plan of New York and Its Environs.

The report points out that there has been a steady change of attitude on the part of property-owners toward restrictions imposed on buildings by the zoning law. They have come to realize that instead of confiscating values of their property, the zoning law protects and maintains those values.

In commenting on the growth of the number of strengthening amendments to the law, Mr. Bassett says in the report:

"These proportions show that the zoning plan had a vitality which was little suspected at the beginning. They show that, as property-owners become more familiar with the protection afforded by zoning, their tendency is to petition the Board of Estimate for an increase of that protection. In the main these changes are brought about by property-owners themselves, for the Board of Estimate seldom refuses to make a change where the property-owners set forth a good case. The Board of Estimate, however, through its chief engineer and the local boards of the various boroughs, makes careful investigation in order to be sure that the proposed change will not injure the city as a whole.

"The experience of eight years has proved that the protective features of the zoning law largely outweigh its drawbacks. It does not prevent proper changes of use, height and bulk, of buildings, but allows these changes to come along when the locality is ripe for a change instead of having the change brought prematurely by two or three exploiters who, for the sake of their own profits, bring disaster upon a multitude of honest investors."

Copies of Mr. Bassett's report, which gives in addition a model State-enabling act for zoning, may be obtained from the Regional Plan of New York and Its Environs, 130 East 22d Street.

The Rolling Rock Country Club

E. P. Mellon, Architect

THE Rolling Rock Club is situated in Westmoreland County, about fifty miles east of Pittsburgh, on the Laurel Ridge of the Allegheny Mountains. It is surrounded by mountains and forests, and from the top of its tower a view is obtained of portions of four different counties.

On a knoll in the midst of the forest sufficient space was cleared to construct the club house and necessary surroundings for club purposes. A golf course was also constructed, the first tee of which is located adjoining the club house.

The problem submitted to the architect was an intricate one, as it demanded an absolutely fire-proof building without producing a formal appearance, and on account of the fire-proofing anything pertaining to a rustic appearance was out of the question. The building is a large rambling one, constructed of terra-cotta and stucco, with trimmings of Indiana limestone, and roofed with Tudor slate. The exterior iron work and all the details harmonize in producing an exceedingly pleasing Italian effect, and any formality or hardness of line which is generally felt in such buildings is entirely eliminated by the building being immediately surrounded by forest trees.

The interior of the building contains every possible requirement of the modern country-club building, and the rooms are finished in a most artistic and comfortable manner.

Some of the special and unusual features are the main stairway, the risers and treads of which are marble, and the treads inset with cork so as to prevent slipping. The railing is also to be noted for its Italian design.

The smoking-room is finished in the same manner as were the first houses of the Allegheny Mountains, which were log-cabins. The logs are hewn and set in place in the same manner as the old-time construction required. The fireplace is built of native surface stones and boulders. The ceiling is constructed of rafters and weathered boards from some of the old buildings, which were originally located on the property.

A very unusual feature of the large living-room fireplace is that it is self-feeding with logs by means of an endless chain, which extends to the logroom below. By touching a button at the fireplace an endless chain revolves and lifts the logs, by hydraulic pressure, to a position directly above the fireplace opening, from which they automatically drop into place on the fire-dogs.

On the exterior of the building to the left of the main entrance there is an outside, heated water swimming-pool, twenty feet by seventy-five feet. This pool is constructed

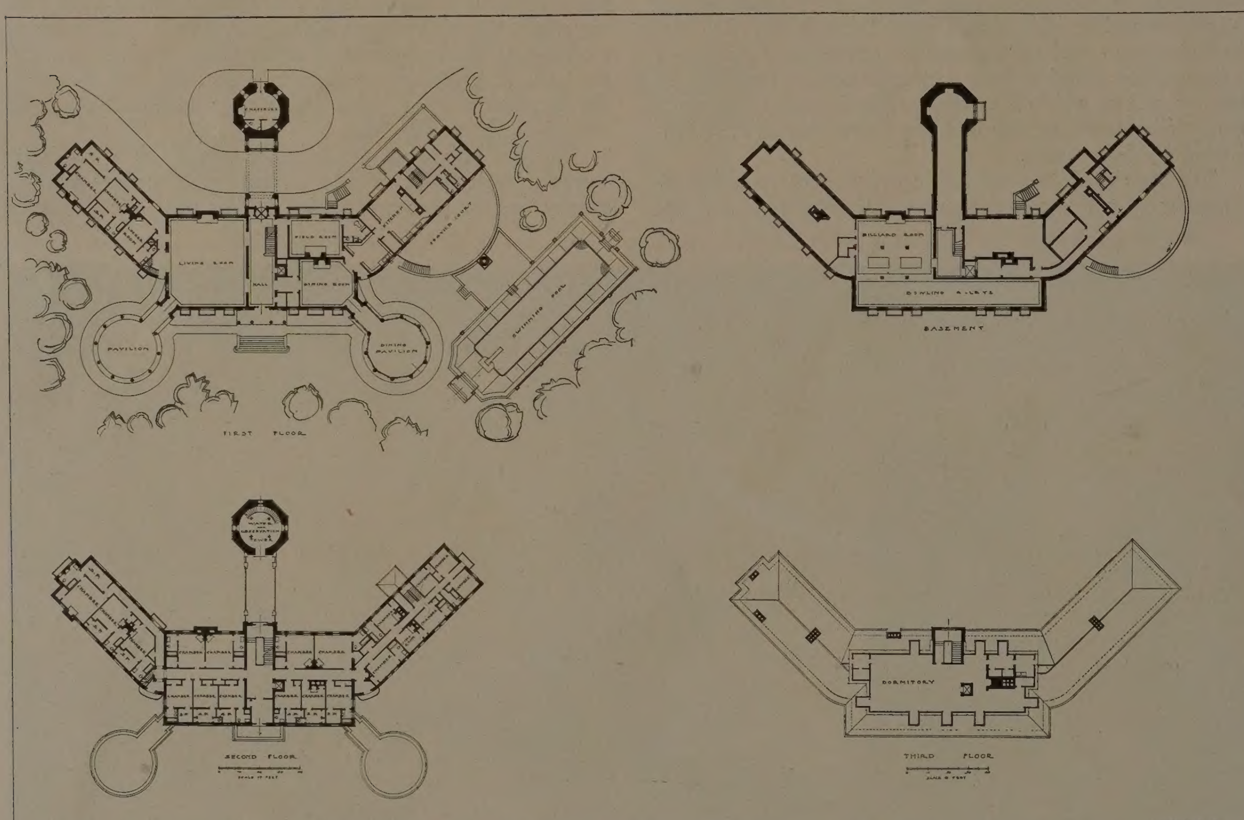
Rear of club house. Tower for housing water-tank, for forest-fire observation, and observatory.

in such a manner that it can be used for skating during the winter. To protect the pool from being harmed by the expansion of the ice, the sides of the pool are battered at the top. Also, to protect the skaters from submerging in case of the ice breaking there are hung floats just below the ice. The pool is surrounded by adjustable electric-lighting, so as to provide for night skating.

A unique feature of construction is the large tower which is built to the rear of the club building. This tower was built for three purposes: one being to contain the water-tank; another for the pleasure obtained by the extensive views; and the third for forest-fire observation. The tower is seventy-five feet high. The walls are thirty-seven inches in thickness and constructed in their entire thickness of native field boulders. Within is a circular stairway of concrete leading to the top. The water which enters this tank is fed by natural gravity from catch-basins located on the mountain-side, two miles distant and three hundred feet above the top elevation of the tower. These catch-basins are supplied by natural springs. This supply is never exhausted, and when the main tank is full the overflow fills a secondary tank, from which the overflow supplies the building, the swimming-pool, and the surplus distributes itself for irrigating the golf grounds.

Under the tower are constructed the boiler and fuel rooms for the heating of the club building. From the boiler-room below there is an ash-hoist which operates within the thickness of the tower wall, hydraulically operated. This runs to a point sufficiently high above the drive grade to permit of loading wagons, and with elimination of manual labor. The mechanism is all concealed, but when the top height is reached the buckets are automatically swung from the interior of the wall to the wagon.

For the construction of the Rolling Rock Club House and its dependent buildings and landscape gardening, native labor exclusively was used and proved to be wonderfully satisfactory, as where skill was required the work was done in the old-fashioned handicraft manner, and no limitations placed upon the amount or quality of a man's daily production. Also, so far as possible, native materials were used which proved themselves to be much superior in quality to the average commercial production.



PLANS, THE ROLLING ROCK COUNTRY CLUB. E. P. Mellon, Architect.

North Carolina's White Pine Excels New England's

WHITE pine planted on the Biltmore estate in North Carolina twenty-four years ago is already comparing favorably in growth with natural stands of the same age in New England, according to tentative estimates made recently by the Appalachian Forest Experiment Station, Forest Service, United States Department of Agriculture. On sample plots in the Pisgah National Forest, yields of 5,000 cubic feet to the acre are being obtained compared with an average of 3,000 cubic feet for New England white pine of the same age on similar sites. The computations made in North Carolina are only approximate, but at least a considerable proportion of the apparent advance over New England timber is easily substantiated in the considerably greater height growth attained in the Southern stands, together with an equal or greater diameter. This increased growth is attributed to the equable climate of the Southern mountains which allows the trees a longer growing season.

E. P. Mellon, Architect.

THE ROLLING ROCK COUNTRY CLUB, WESTMORELAND COUNTY, PA.

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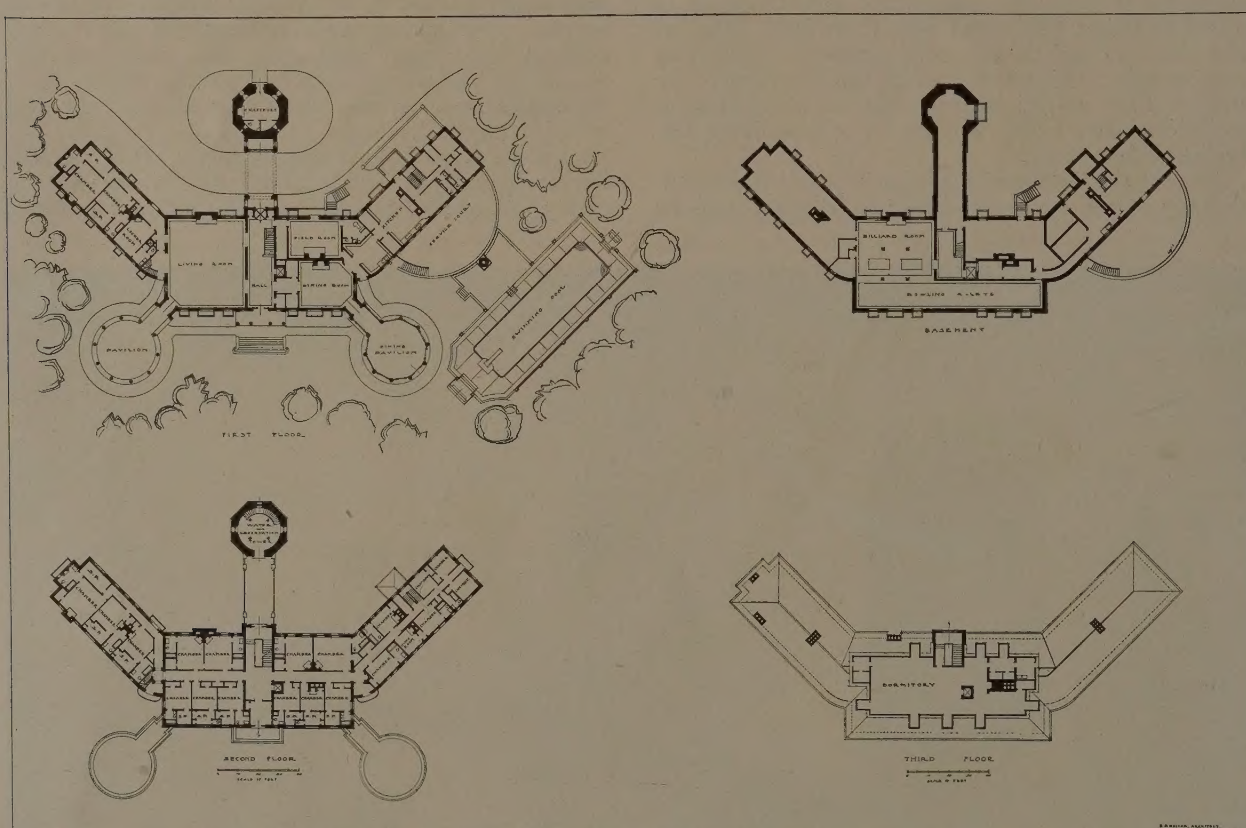

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THE ROLLING ROCK COUNTRY CLUB, WESTMORELAND COUNTY, PA.

E. P. Mellon, Architect.

HALL AND STAIRCASE.

FIELD ROOM. E. P. Mellon, Architect.

THE ROLLING ROCK COUNTRY CLUB, WESTMORELAND COUNTY, PA.

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Editorial and Other Comment

A Matter of Sentiment

IN these days there isn't any possibility of letting things alone. Change is the order of the times, and change we must, willy-nilly. When it comes to changing the White House interiors from French to American it is a matter of grave moment to the whole American people. That shrine of the nation's beginnings is not a private residence to be treated as one would treat a little home in the suburbs or in the social belt of the Newport millionaires. It has much of the sacrosanct atmosphere that environs and provokes the reverence of the thousands who make the pilgrimage to Mount Vernon. There the ladies have restored the mansion with the idea of making it express the place as it was in Washington's own days. Happily, they have been able to gather much of the original furniture, and made it look more like a home than an antique shop.

When Colonel Roosevelt lived in the White House it was redecorated under the supervision of the late Charles F. McKim, and in accordance, we understand, with Colonel Roosevelt's preferences. We feel that the White House is but a temporary abiding-place for Presidents, and that the traditions of the place are more to be considered than the personal tastes of passing occupants.

If there is a house in the country that should express in its every detail the spirit of American taste at its best, it is the White House. The beauty and charm of the Colonial, its reserve, lack of ostentation, its democratic simplicity, its dignity and refinement, seem to us quite superior to any product of France, when associated with such a lovely example of our early architecture as the White House.

The changes proposed, we understand, have been suggested by Robert W. deForest, of the Metropolitan Museum of Art, and will be carried out under the able and very competent direction of Mr. R. T. H. Halsey, who is responsible for the arrangement and decoration of the American wing at that wonderful institution.

The President always has his troubles, and in the proposed changes in the White House he and Mrs. Coolidge will be the centre of a nation-wide discussion of "how to furnish the home."

Somehow we can't help feeling that "Colonial fixings" will make a much more appropriate background for present occupants, as well as future, and in saying this we mean to say that it has been a long time since the House was occupied by a family more expressive of the *homely* Colonial virtues we can all admire and appreciate.

We gather from Mr. Halsey's report that a "hodgepodge" of various incongruous furnishings has been gathered in the years, and we feel entirely sure without the knowledge or approval of any one who might be called an authority.

We sincerely hope, in any event, that Mrs. Coolidge will not be deluged about Christmas time with gifts of Colonial heirlooms from all the dust-laden attics in Vermont.

Choosing an Architect

WE have been reading a recent article in *The Churchman* by Mr. William O. Ludlow, of the firm of Ludlow & Peabody, on "Getting the Best Building—How to Start Right." It contains some excellent advice to congregations thinking of building a new church.

Many times there exists the idea that it is quite impossible to engage the services of architects of reputation in a mistaken notion that the cost will be prohibitive. That this is not so has been proved time and time again, and *The Lutheran Church Review* has been continually preaching the benefits of going after the best talent available.

Our church architecture has improved, but there is room for further advance all over the country. Mr. Ludlow points out the essentials of good church designing, and goes on to tell how to make a success of the job after the architect has been selected.

We once wrote an editorial on "Calling the Doctor" that was widely quoted bearing on this topic. Mr. Ludlow says:

"An architect should be selected just as you select those other professional advisers—your doctor or your lawyer—find out what he has done and how well he has done it. This is best accomplished by personal interview, by seeing completed work, or photographs of completed work, by the opinion of former clients of the architect, and, perhaps best of all, by obtaining the opinion of fellow practitioners.

"Having finally selected an architect in whom you have entire confidence, give him your confidence, be entirely frank with him as to your financial resources, take his advice, and put the responsibility squarely up to him for results. In this way you will make a real friend of him, and he will give you the best that is in him. After a number of conferences with you and thorough study of your church needs, he will make sketches of plan and elevation, revising and altering them in conference with you as many times as need be to meet your requirements as to arrangement and available funds, and finally he will produce plans and a picture for publication with an estimate of the probable cost.

"You are then able to put before your people a definite and businesslike proposal, and this will form the basis of your campaign for funds. How this campaign should be conducted is another long story, varied in the telling to fit the widely different conditions of each case. There are able firms who make a business of conducting such campaigns, but as a general observation the outstanding elements of success are these: a thorough organization of the entire membership, competent and enthusiastic leaders, a short and intensive campaign period, and an unwavering faith that God is peculiarly with you in this business of building His house."

From the Paris Exhibition

WE are in receipt of some information from the Paris show of the decorative arts that leads us to the conclusion that it is in the hands of the extreme moderns to a great extent. One writer dwells on the architectural features, and thinks them beneath contempt. Of the exhibits, he says that France, Czecho-Slovakia, Austria, and Spain show the most originality, while Poland, Holland, Sweden, and Denmark have especially interesting exhibits.

The cubists have evidently been going strong, for the tendency of much of the work is toward "angularity of form, and in color there is an utter disregard of those hues which are to be seen in nature."

"Of the national pavilions the two most beautiful are those of Italy and Spain, and the ugliest those of Soviet Russia and Great Britain."

E. Fletcher-Clayton, writing in *The Decorator*, London, says it is "a great pity that the decorative art of the United States of America is not shown; for such, which is unfortunately unknown here, would rank with the very highest for originality." That is a nice thing to say, at least, and we wonder how we should have fared if we had shown our wares.

Bringing the Cellar Up-Stairs

WE have been in many cellars that made us think of the last days, of the vaulted glooms where Romeo and his lady ended their little brief life of love, of cold and damp and worms, and all sorts of unpleasant things, and in days of loved memory we recall certain cellars that were cold and yet not without cheer, where a spirit of genial hospitality prevailed, and gloom was washed away in ambrosial fluids. Why not make the cellar a jolly place for play and comfort, of light and cheer, a usable part of the house? If it can be no longer put to the uses of old, put it to other uses, modernize it. That is the proposition put before architects and draftsmen in "The Ideal Cellar Competition," announced in other pages, and we commend the idea to our readers. Of course the first essential from the merely business point of view is a matter of suitable heating; but there are other good and sufficient reasons for giving the cellar more consideration than as a mere place for storing coal and stoking.

"The second step in modernizing the cellar is to be a recognition by the architectural profession of the possibilities of designing and planning the cellar of the average American home of eight rooms or more in such a manner that the cellar space will be provided with a series of practical utility features and one or more interesting, livable rooms, which will add to the living comfort and realty value of residential properties. The purpose of the Ideal Cellar Competition is to place this problem of cellar planning *and design* before the architectural profession for the development of suggestions which will indicate, in a practical manner, the arrangements of cellar space that can be made to provide a direct return, and to establish a capital valuation which will be clearly recognized in residential real-estate transactions of the future.

"The third step, which must naturally follow this valuable economic contribution by the architectural profession, will be the general acceptance of this idea of the improved cellar, and its recognition by owners, builders, and those who sell, rent, or finance homes. Over $2,000,000,000 is at present invested in the cellars of existing American homes, and at the present rate of dwelling construction $300,000,000 is being invested annually in cellar construction by the home-builders of the United States. This Ideal Cellar Competition promises to exercise a new influence on this vast expenditure, which will quadruple the efficiency of the investment and aid materially in offsetting costs."

An Important Announcement to Our Readers

IT is with special pleasure that we announce a new series of articles by Mr. H. Vandervoort Walsh, Professor of Construction, School of Architecture, Columbia University. Our subscribers will recall previous articles by this instructive and interesting writer on "The Construction of the Small House" and on "Apartment-House Construction." These were eminently practical, and gave architects a great deal of information based on years of study and personal contact with modern building methods.

Mr. Walsh's new series will take up a subject of exceptional interest.

In "THE EFFECT OF GRAVITY ON BUILDING CONSTRUCTION" he traces the work of the oldest builders, the great achievements of mediæval days, considers the tendency of modern times blindly to follow precedent and old traditions, and says that in spite of this we have learned to build in very different ways from our ancestors. "The new methods of construction are the result of the investigations carried on by a few independent thinkers. The steel frame, reinforced concrete, the truss, Portland cement, and other features of modern construction are absolutely new and are the children of knowledge developed by a few individuals who refused to accept ideas simply because they were old."

The four types of building known to architectural history are: "Skeleton Construction," "Simple Block Construction," "Balanced Block Construction," and "Cohesive Construction."

We venture to say that this series will prove one of the most valuable the magazine has published. It will review the historical periods briefly in passing, but the main theme will bear on thoroughly practical things in modern building construction.

"Galileo gave the first description of a force as a mechanical agent, but he summed up certain ideas that had been growing in other men's minds. These we must consider in their relation to the development of the knowledge of building mechanics."

The series will begin in September and run a number of months.

It Can Be Done

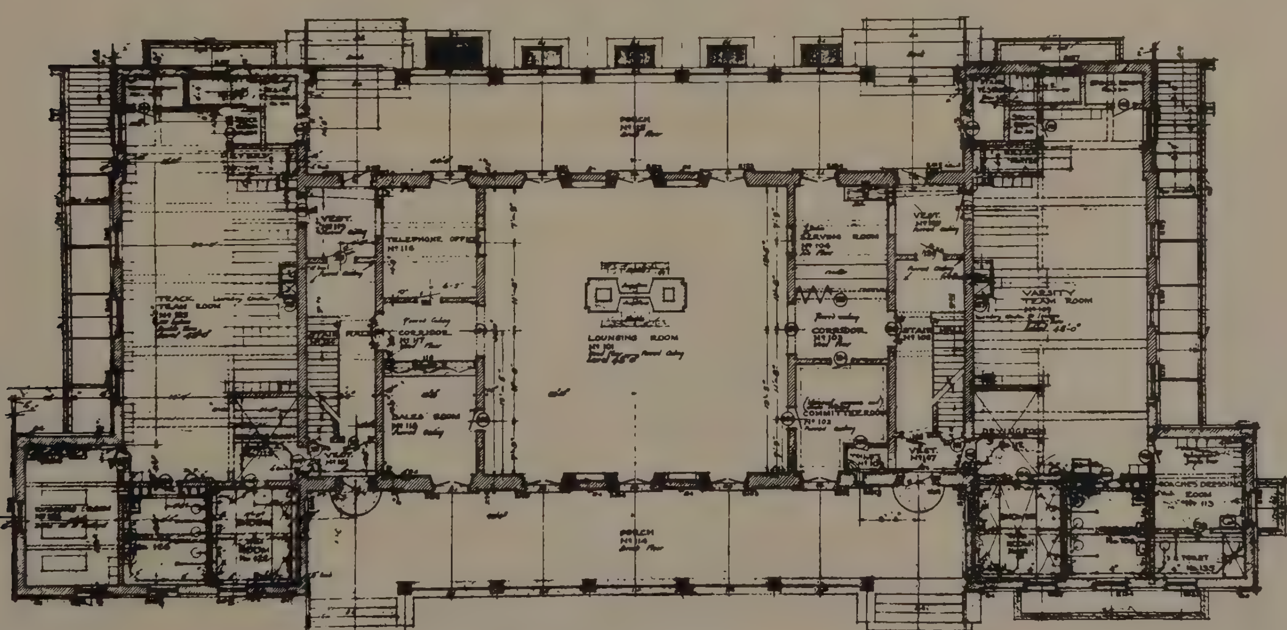
THAT apartment-houses can be built to yield a fair return on a rental basis of nine dollars a room has been amply demonstrated by the Metropolitan Life Insurance Company.

They tried the experiment as an after-war measure to help relieve the housing congestion, and the results offer interesting facts for the serious consideration of other investors. An item worth noting is that the loss from vacancies from July, 1924, to June 30, 1925, was only $406.54! The net returns for the twelve months were $681,181. Two thousand one hundred and twenty-five families were housed.

VIEW FROM SOUTHEAST, SHOWING FAÇADE AT LEFT FACING DERBY AVENUE. Day & Klauder, Architects.

LAPHAM FIELD HOUSE, YALE UNIVERSITY, NEW HAVEN, CONN.

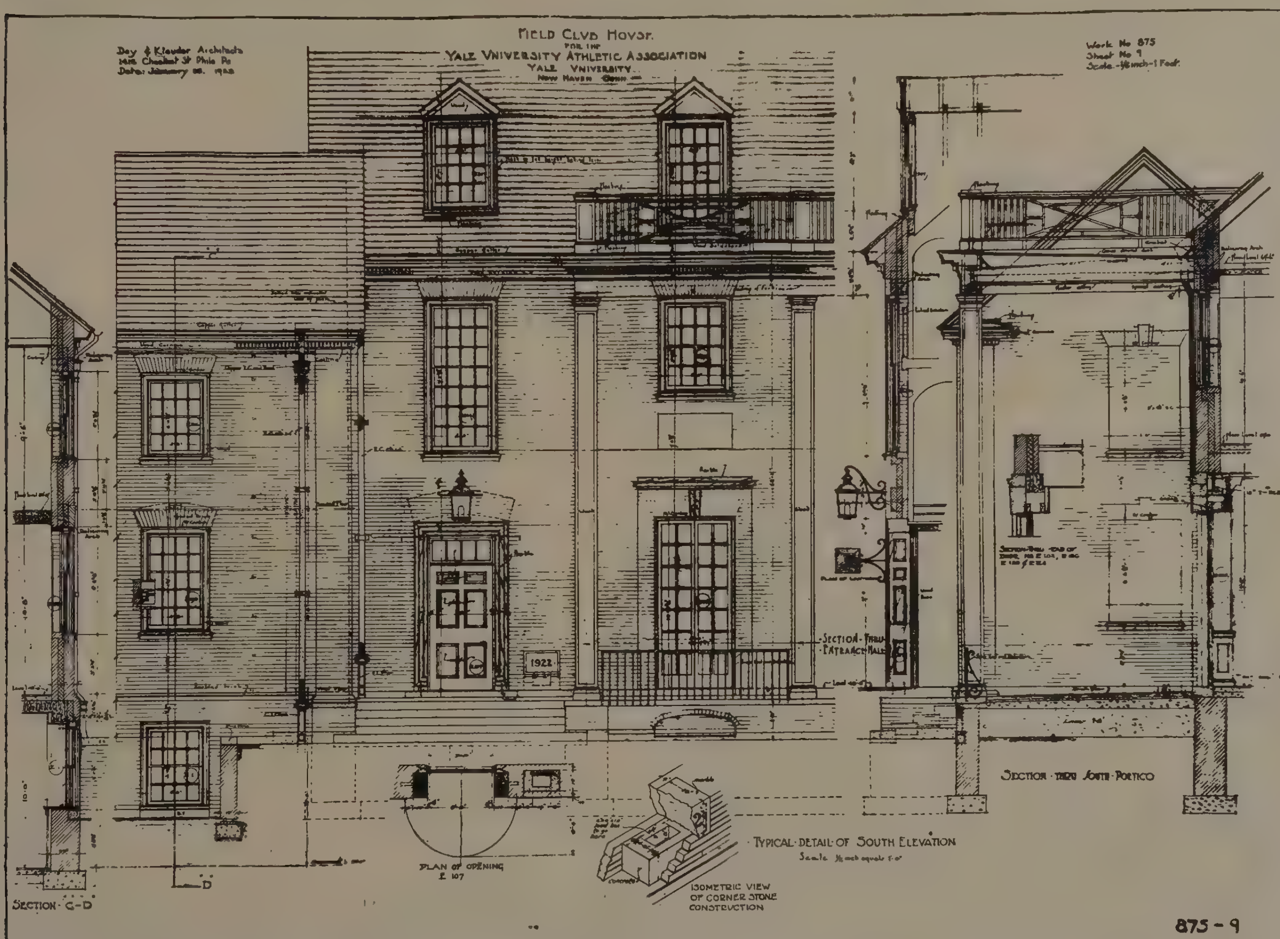
VIEW FROM THE NORTHEAST, SHOWING FAÇADE FACING THE TENNIS-COURTS.



LAPHAM FIELD HOUSE, YALE UNIVERSITY, NEW HAVEN, CONN.

Day & Klauder, Architects.

SOUTH VERANDA.

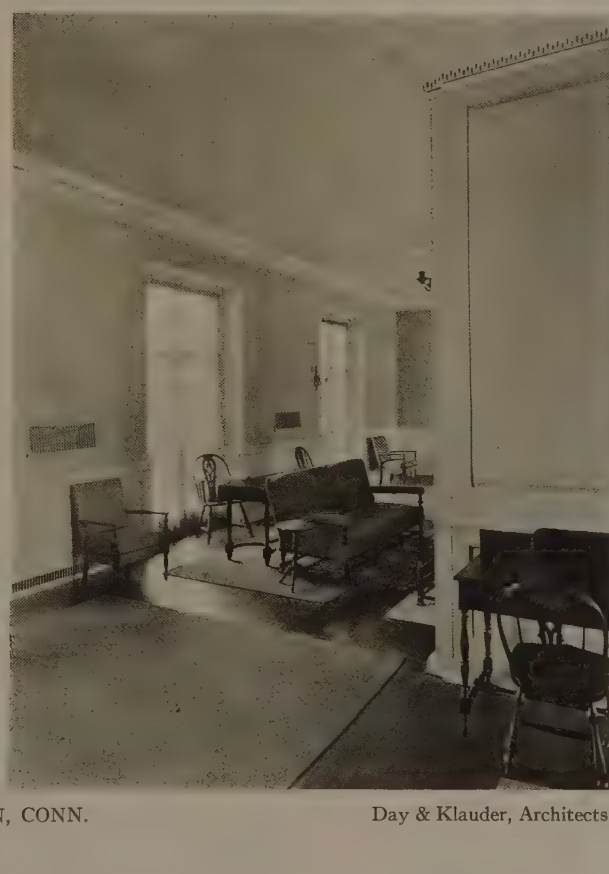


DETAIL OF SOUTH ELEVATION.

Day & Klauder, Architects.

LAPHAM FIELD HOUSE, YALE UNIVERSITY, NEW HAVEN, CONN.

The living-room as divided by the central free-standing chimney-stack with a fireplace on each side. Simple furnishing and excellent decorative details distinguish this room. It opens on both north and south verandas through full-length casements.

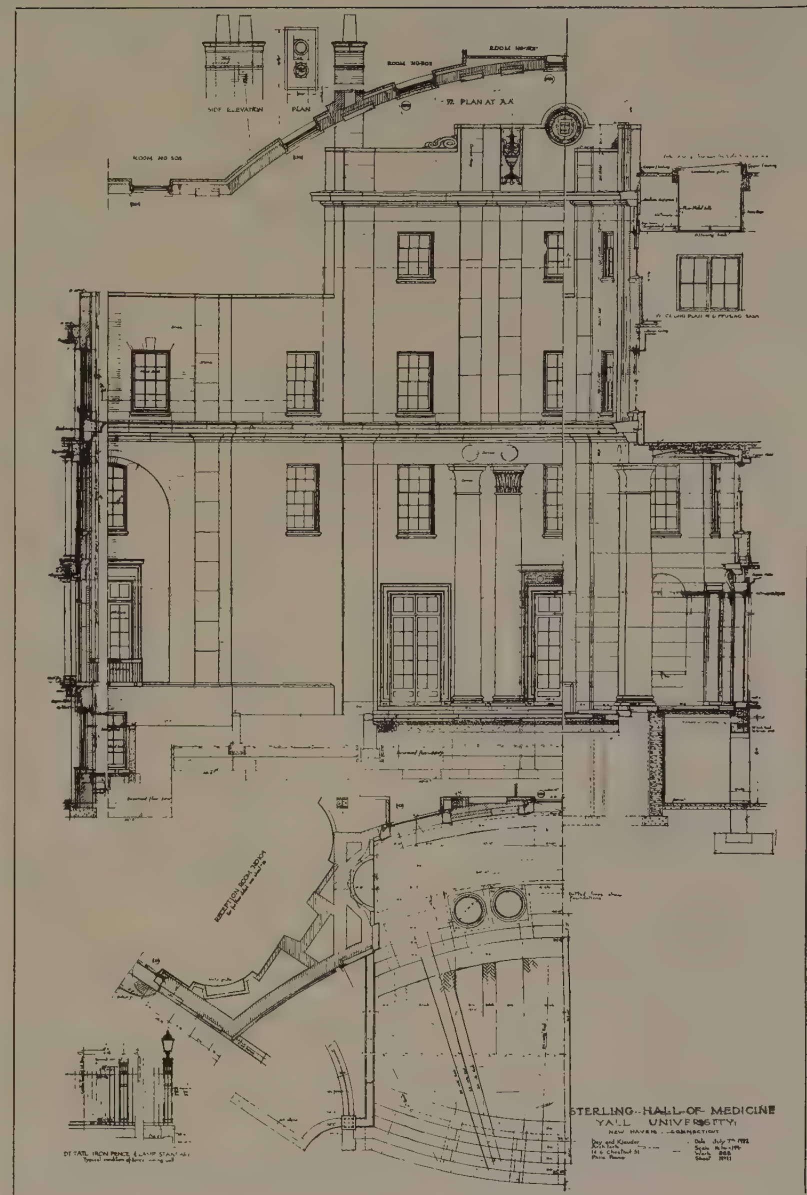


LAPHAM FIELD HOUSE, YALE UNIVERSITY, NEW HAVEN, CONN. Day & Klauder, Architects.

SKETCH BY MR. KLAUDER.

THE STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN.

Day & Klauder, Architects.



MAIN PAVILION AND ENTRANCE, CORNER CEDAR AND BROAD STREETS.

Day & Klauder, Architects.

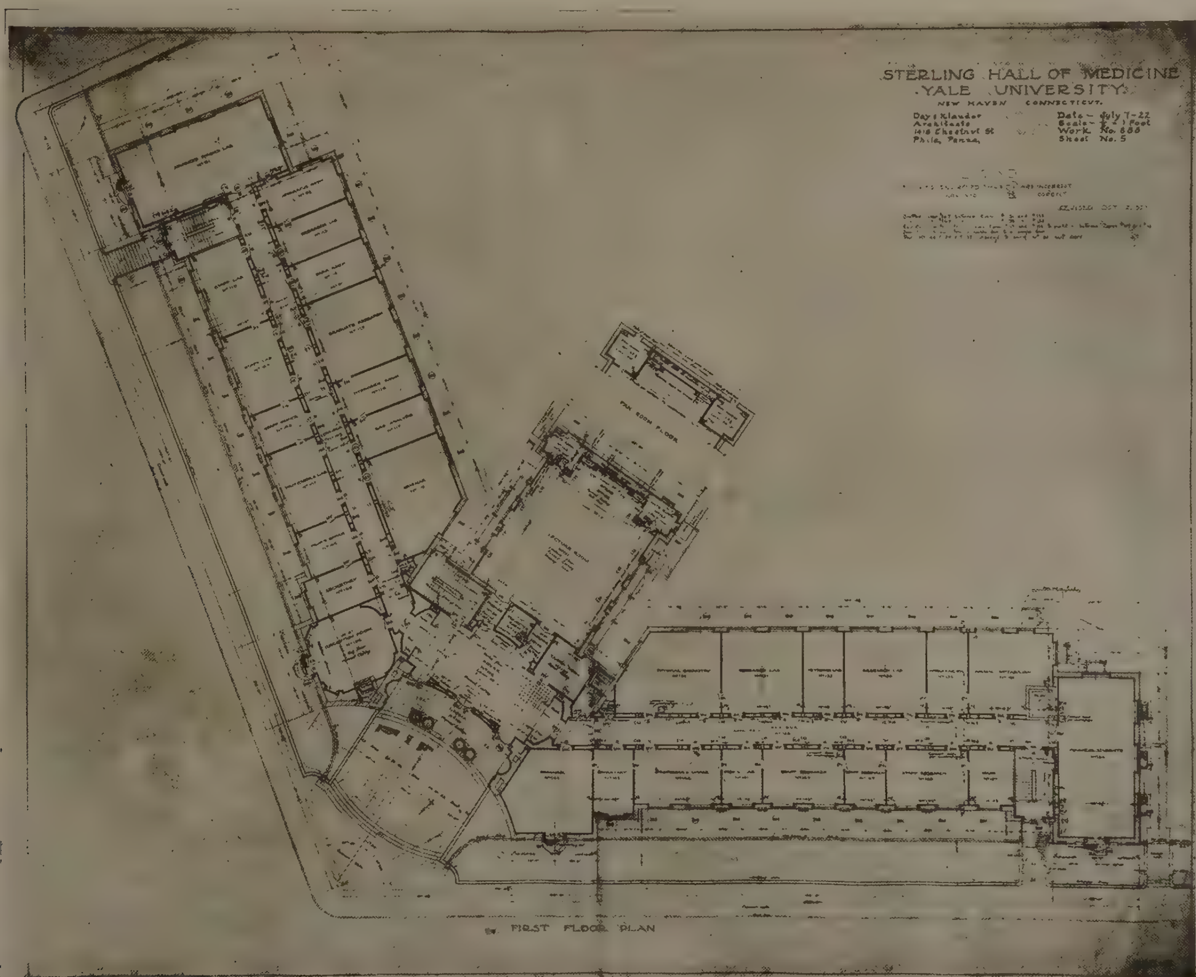
THE STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN.

PAVILION AND EXIT AT NORTHEAST END OF BROAD STREET WING.

PAVILION AND EXIT AT SOUTH END OF CEDAR STREET WING.

THE STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN.
Day & Klauder, Architects.

VIEW FROM THE GROUNDS, SHOWING THE BACKS OF THE TWO WINGS. THE LOW WING IN THE FOREGROUND IS THE ANIMAL RETENTION HOUSE.

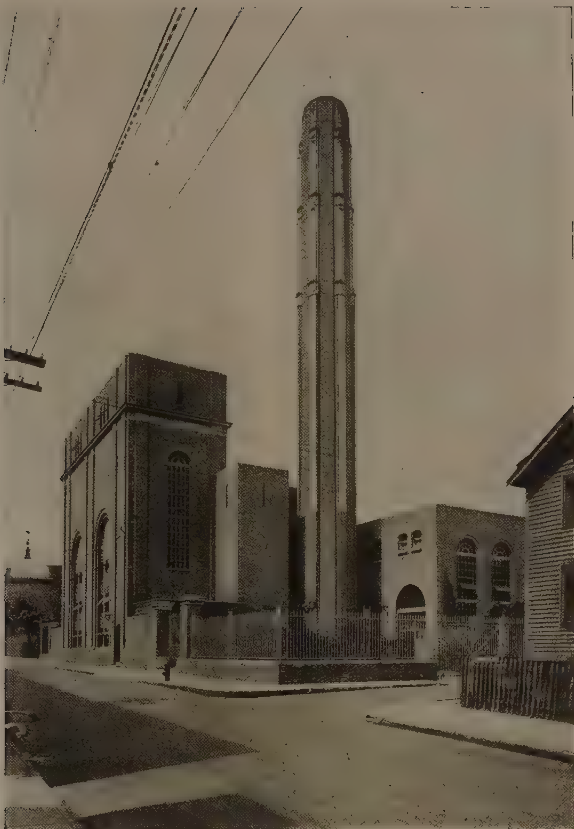


STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN. Day & Klauder, Architects.

LECTURE-HALL.

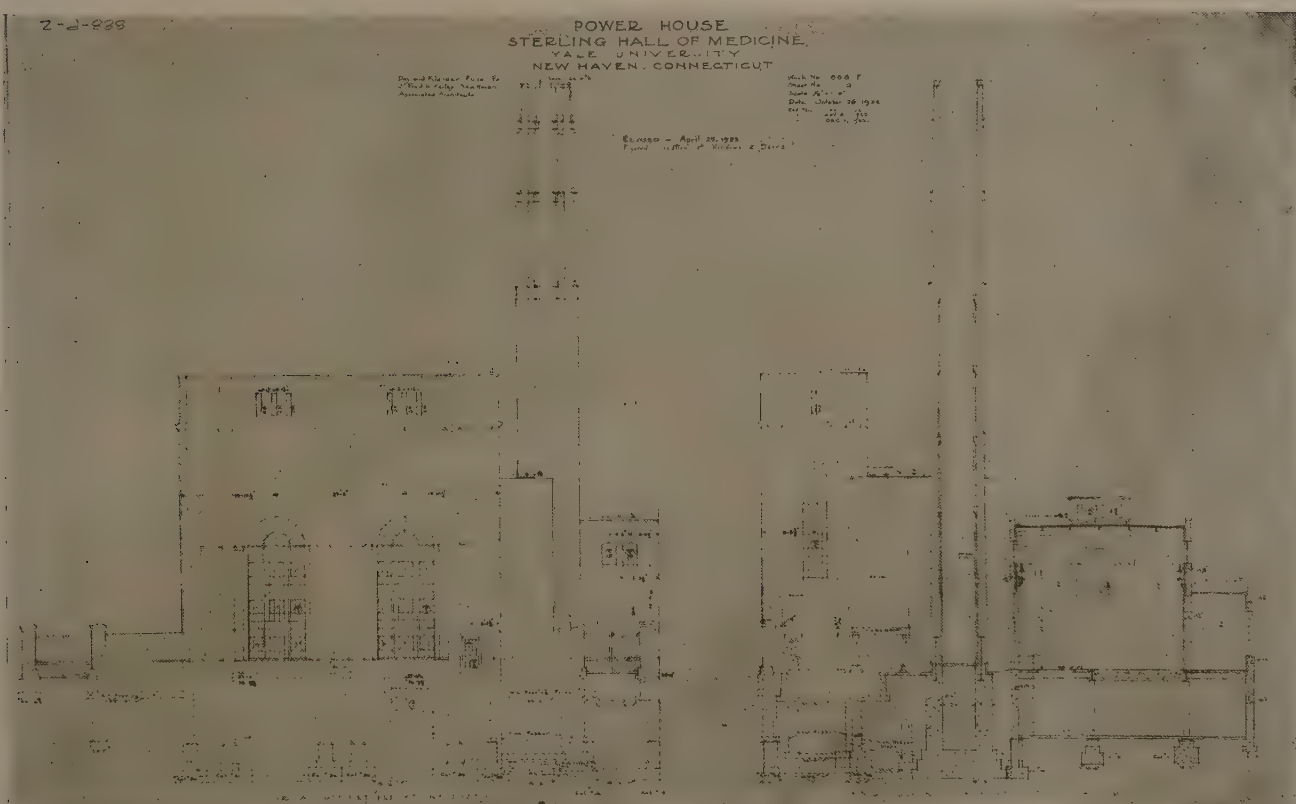
ENTRANCE-HALL. ENTRANCES TO LECTURE-HALL AT THE RIGHT. Day & Klauder, Architects.

THE STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN.



VIEW FROM ROSE STREET, NORTHEAST.

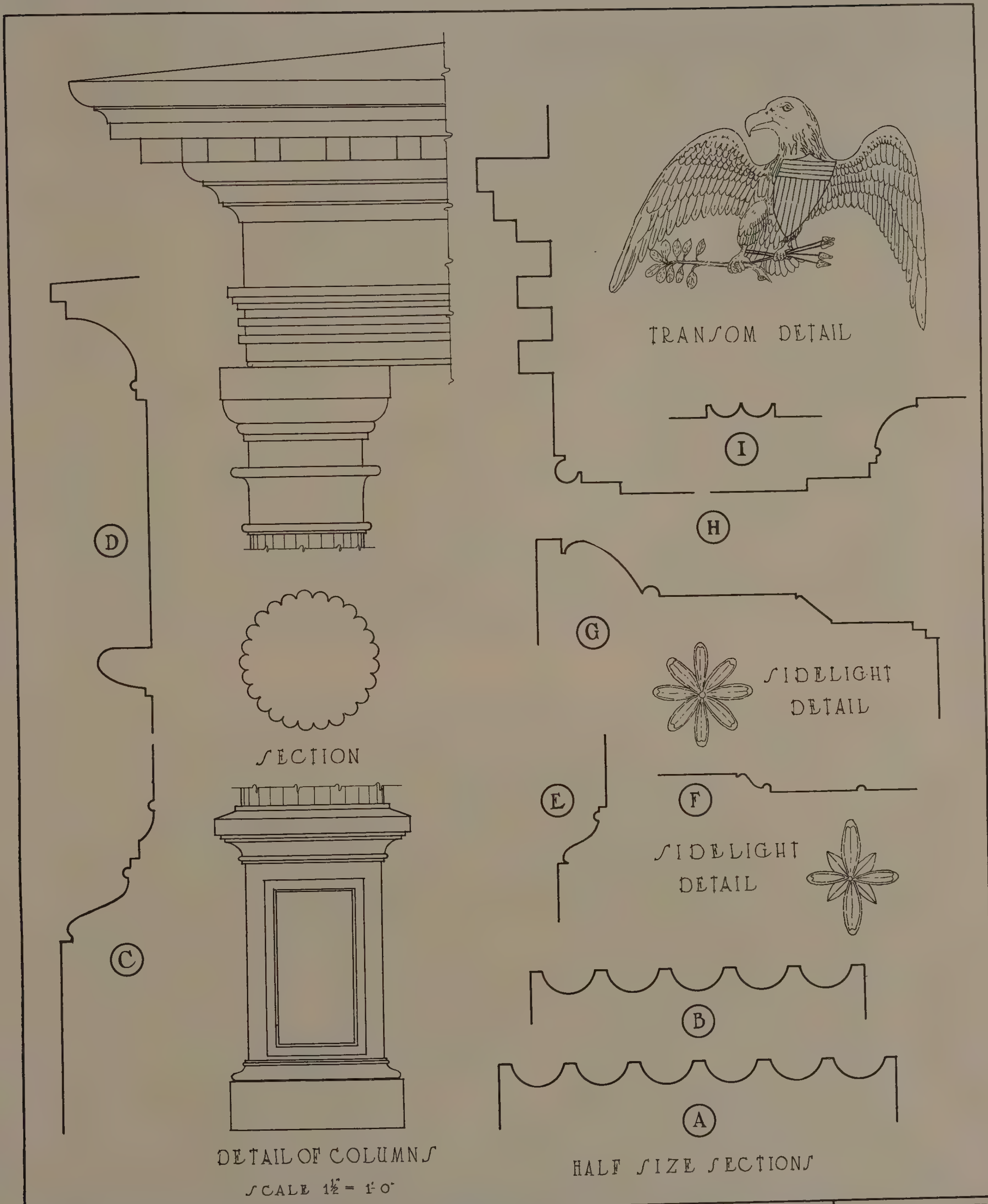
VIEW FROM THE GROUNDS, NORTHWEST.



POWER-HOUSE.

Day & Klauder, Architects.

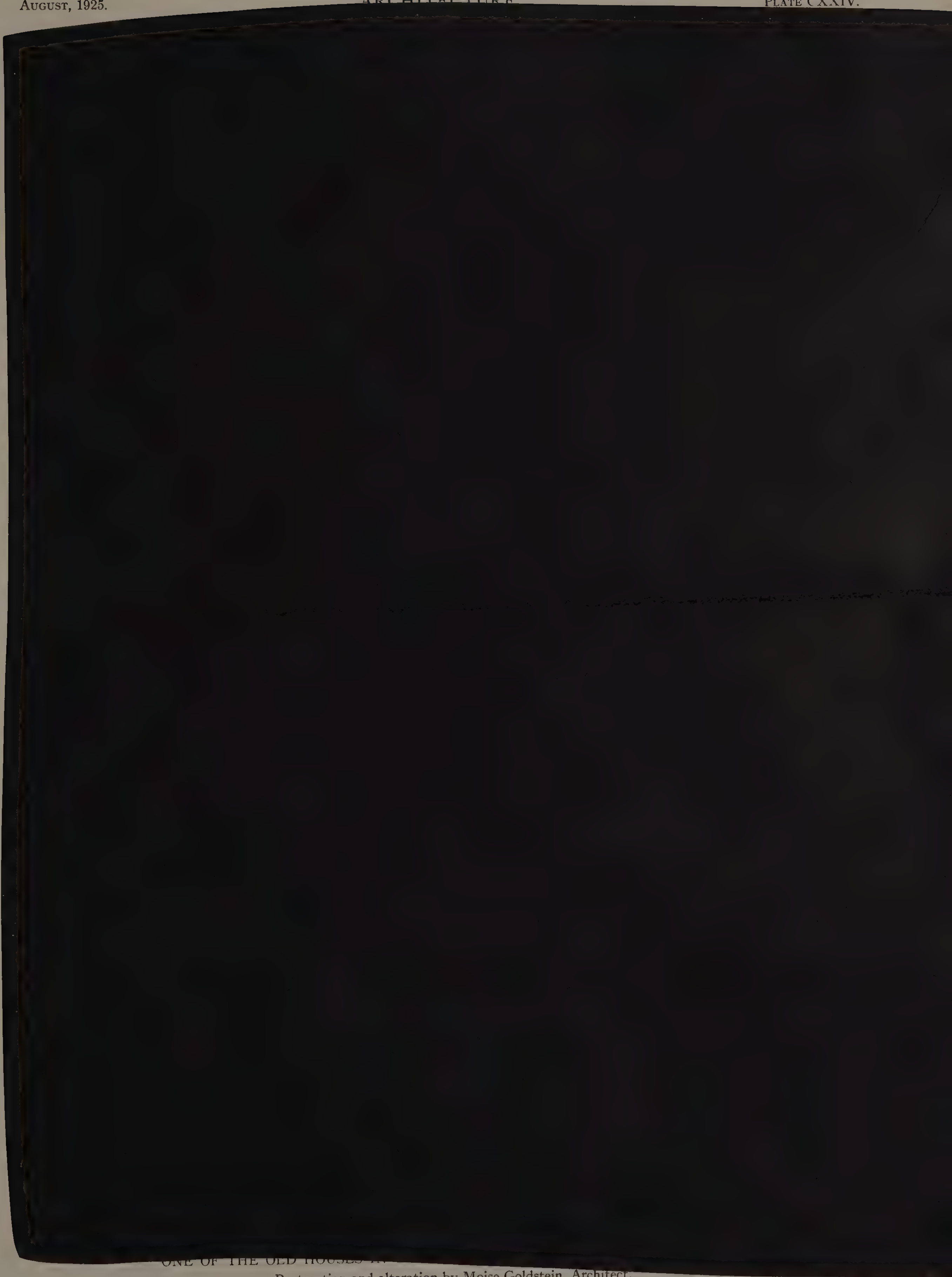
STERLING HALL OF MEDICINE, YALE UNIVERSITY, NEW HAVEN, CONN.



MAINE COLONIAL SERIES

DOORWAY of the GENERAL VEAZIE HOUSE TOPSHAM . MAINE BUILT IN 1800

MEASURED AND DRAWN BY A. J. HARRIMAN.



ONE OF THE OLD HOUSES ...
Restoration and alteration by Moise Goldstein, Architect.

A HOUSE OF THE SAME TYPE BEFORE ALTERATION.

THE HALL AND STAIRWAY OF HOUSE.

HOUSE IN THE FRENCH QUARTER, NEW ORLEANS, LA.

Restoration and alteration by Moise Goldstein, Architect.

THE COURTYARD.

Restoration and alteration by Moise Goldstein, Architect.

AN OLD HOUSE IN THE FRENCH QUARTER, NEW ORLEANS, LA.

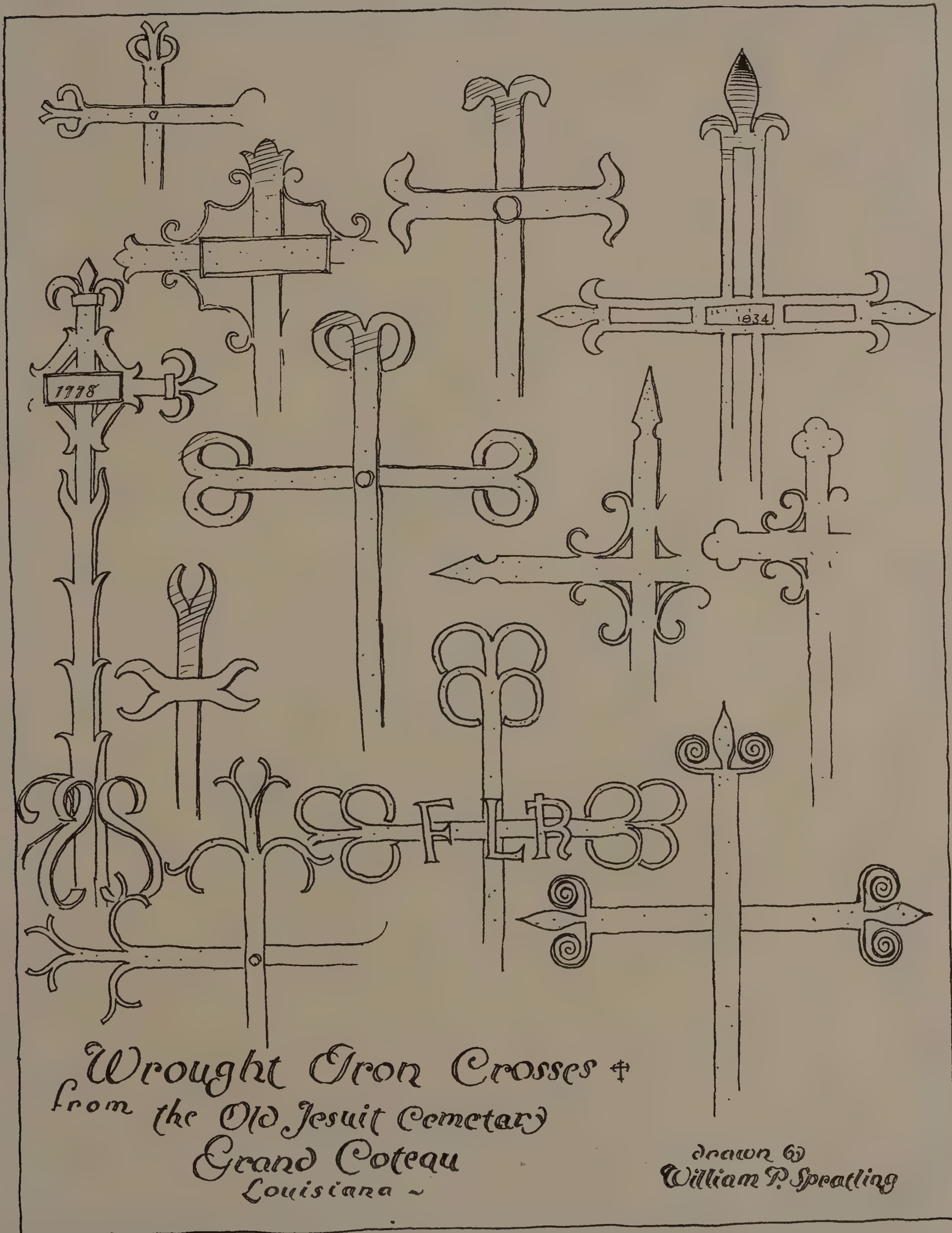
LIVING–ROOM.

HALL.

DINING–ROOM.

OLD HOUSE IN FRENCH QUARTER, NEW ORLEANS, LA.

Restoration and alteration by Moise Goldstein, Architect.


FLR
1834
Wrought Iron Crosses
from the Old Jesuit Cemetary
Grand Coteau
Louisiana ~
drawn by
William P. Spratling

The Medical Building and Hospital for the University of Chicago

Coolidge & Hodgdon, Architects

THE University of Chicago has just let the contract to build a medical building and hospital, and the work for the same has commenced. This group is located west, across the street, from the teaching campus and faces south on the Midway, and will occupy two city blocks. A rough idea may be gained of the size of these buildings when it is realized that they contain one-third as many cubic feet as all the rest of the University buildings. The buildings were designed after a study of hospitals in this country and abroad and consultation with medical educators with the idea of meeting the requirements of education and research in medicine, and providing the best facilities for the care and treatment of patients.

It was felt that the requirements for medical education and research might best be met by providing for the different laboratory branches and the two main divisions of clinical medicine, medicine and surgery, in separate buildings, which would be more or less complete in themselves and might be operated as units. At the same time it was felt that a physical separation was not desirable, in order to secure a correlation and co-ordination of the work of these departments, for the purposes of relationship to the public in the care and treatment of patients and for the sake of economy and efficiency in operation, to avoid duplication of services that might be used in common.

It was an essential part of the scheme that additions might be made to each of these units for expansion and for the accommodation of related subjects without any change in the arrangement of the present buildings. It is planned to erect five buildings at this time; one for physiology, pharmacology, and surgical chemistry, which at present will not be connected with the other buildings in the group; a building for the medical clinic; a building for surgical clinic; one for pathology, and one for administration and the common services. The buildings will be grouped around courts. The northern end, which is at the top of the general perspective, will be the medical school court, from which entrance will be gained to the different laboratory buildings and to the laboratory section of the medical clinic and the surgical clinic. That is, this court will be used largely by students and members of the staff who are more directly concerned in the educational features of the work.

The building for pathology is placed between the northern ends of the medical building and the surgical building, which are joined toward the south by the administration building, forming a large central court. The main entrance of the administration building is at the north end of the first central court, facing the Midway. The west side of this court is occupied by the dispensary, with its entrance for dispensary patients. The ambulance entrance will be at the southwest court and the service entrance is in the middle-west court.

North entrance tower to Medical Building, University of Chicago Medical Building and Hospital.

The material for the exterior throughout is Indiana limestone, like the material used in all of the other buildings of the University. The buildings are wall-bearing with reinforced concrete floors and columns. The ceilings throughout the laboratories will be unfurred, and the interior walls and ceilings of the medical school and laboratories will be left unplastered and will be painted directly on the brick and terra-cotta.

The heating throughout the group will be done by hot water, heated in four heaters centrally located. The water for domestic use will be heated in the basement, and the steam brought from the power-house. Refrigerator machin-

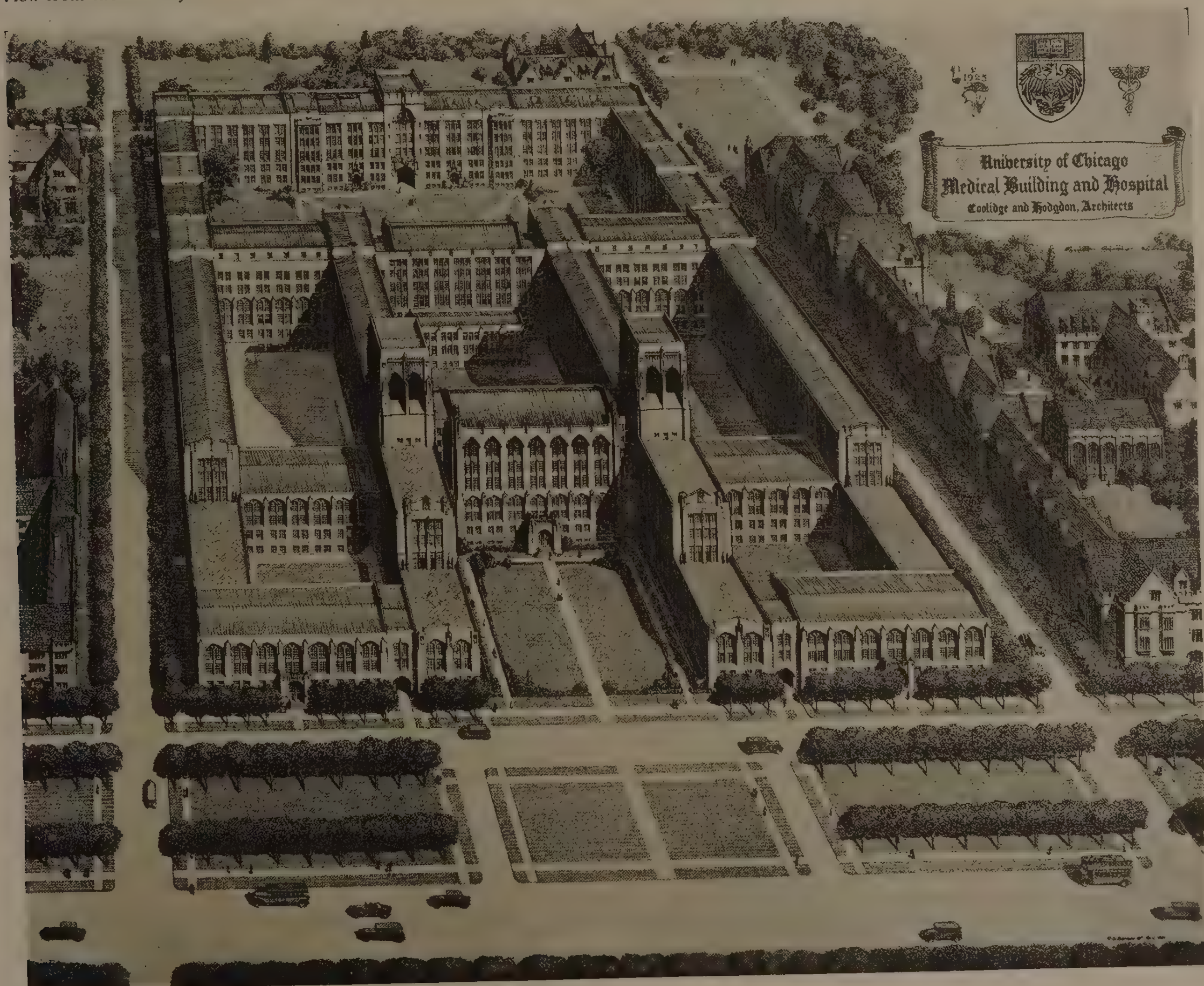
Medical School court, looking south.

Physiology Building from Medical School court, University of Chicago Medical Building and Hospital. Coolidge and Hodgdon, Architects.

ery will be in the basement, and the brine will be piped to the various refrigerating centres. The electric service is partly furnished by the University and partly purchased. Underneath the entire building is a sub-basement, 6 feet in the clear, which is to be used for piping, ventilating ducts, and machinery equipment. The other stories above are 10 feet 10 inches in height from floor to ceiling.

The two central towers are used for elevator machinery and tanks, and are slightly higher than the towers of Harper Library on the campus one block east.


View from the midway.



On the first-floor centre portion of the building is the main assembly-room, which seats 280 people. Above this, on the second floor, is the Billings Memorial Library, which is estimated to hold 8,000 volumes. This library has been given to the Medical School by Dr. Frank Billings.

Dining-rooms for nurses, staff, and petty officers, serving-rooms, the kitchen, storerooms, etc., are located in the basement. The buildings are equipped with six electric elevators, pneumatic tubes, refrigerating machinery for cooling the water and making ice; there is a doctor's call system, doctor's "in" and "out" system, and nurse's and orderly's call system.

The operating-floor is on the top floor of the centre portion facing north, and is largely planned to meet the requirements of an ordinary hospital and partly for a teaching hospital of an expected future capacity of 600 beds. The present capacity of the hospital is for 200 beds.

Country Villages Need Toning Up, Say Government Experts

NEED for improving country villages in the United States to meet modern social and economic needs, is emphasized in a nation-wide survey made by the United States Department of Agriculture.

Most villages, declare department officials, have "just grown up," with resultant defects in form and arrangement to provide social, æsthetic, and economic advantages for residents and near-by farm families. The need for well-planned villages is pointed out in the fact that some 20,000,000 people in the United States live in villages, and that more than 30,000,000 farm people use these centres for purposes of trade, education, religion, and recreation.

Numerous instances are cited by the department where villages have been literally rebuilt to meet modern requirements. The village of Weston, Mass., for example, under the direction of the town-improvement commission has in the past few years entirely reconstructed its business district to form a notable civic centre. Old public buildings and shops have been removed, a disease-breeding swamp was filled in and grassed over to form a common, a beautiful new town hall was erected, public buildings were regrouped, and convenient approaches and roadways constructed.

The unfortunate results of undirected development in cities are being keenly appreciated, it is stated, and millions of dollars are now being spent to correct these conditions in an effort to make cities more approachable, traversable, convenient, orderly, and beautiful.

A similar situation prevails with regard to villages the country over, and replanning along proper lines now will mean considerable money saved later. Villages should be easy of access, declare the department officials, and approaches should be direct, durable, and enjoyable. Physical layouts should be based on naturalness, healthfulness, and convenience; housing conditions should be sanitary, convenient, and economical; dwellings should be satisfactory to the eye and set in pleasant surroundings.

There should be clean and well-kept lawns, tree-bordered streets, and good architecture. Dump heaps and congested places should give way to open spaces, and public parks and playgrounds, lake shores, spots of natural beauty, and points of historic interest should be set apart for the use and enjoyment of all. Public buildings should be located and arranged so as to facilitate business efficiency and stimulate civic pride.

The department has analyzed a number of instances where villages have been improved, and incorporated them in a new bulletin for free distribution. The bulletin deals with practically all phases of village improvement, and tells how individual villages have solved this problem. Copies of Farmers' Bulletin No. 1441 entitled "Rural Planning the Village," may be obtained upon request to the Department of Agriculture, Washington, D. C.

Book Reviews

SCHOOLHOUSES AND THEIR EQUIPMENT. With Plans and Illustrations of the Newest Schoolhouse Architecture. New York State Edition. By W. W. La Chance. White & La Chance, Architects, 426 Third Street, Niagara Falls, N. Y.

This book, based on many plans that have stood the test of repeated use, should be of especial value. It is a practical book dealing with matters of vital interest to every community, and is based on wide experience in this special field. The schoolhouses shown are nearly all of comparatively small size and moderate cost.

THE HOUSE THAT LOVE BUILT. By W. Francklyn Paris, M.A., L.D.H. The Hadden Press, New York.

"The House that Love Built" is a book of essays on the applicability of Italian Renaissance to modern public buildings, with Cass Gilbert's beautiful Detroit Public Library serving as an example. Mr. Paris is a decorator of established reputation whose work adorns the interiors of some of the most important public buildings in the United States. In association with Frederick J. Wiley he has contributed to the decoration of the Missouri State Capitol, the West Virginia State Capitol, and to the library building chosen as the theme of the present volume.

Mr. Paris is already known as the author of "Decorative Elements in Architecture," a book recommended by the United States Bureau of Education for its reading course on "How to Know Architecture." In the present volume he analyses the qualities that make the Detroit Library the rare flower of architecture that it is. The entire edifice is studied, but particular stress is laid on the ornamentation. There are chapters on Painted Glass, Mosaic, and Ceilings that are especially complete and profusely illustrated.

EVERYMAN'S HOUSE. By Caroline Bartlett Crane. With a foreword by Herbert Hoover. Illustrated. Doubleday, Page & Co.

"This book is written to the thousands of people who long to build a home of their own but fear they cannot afford to. Also it is written to those who cannot make up their minds as to what kind of a house they want." It was "built about a mother and her baby." So you see it is a book full of sentiment, one of those books that appeal especially to the reader of the popular home periodicals. It is the human side of home making that is paramount. Mrs. Crane was the winner of the first prize in the Kalamazoo, Michigan, Better Homes Demonstration in 1924. Gilbert Worden was the architect; Mrs. Crane the designer. It is an attractive little house, well planned. The floor plans and elevations are shown.

MASTERPIECES OF SPANISH ARCHITECTURE. ROMANESQUE AND ALLIED STYLES. One hundred plates. With Text by John Vredenburgh Van Pelt. Pencil Points Press.

This book is made up of one hundred plate pages containing hundreds of details, sections, and elevations showing examples of Spanish architecture in the Romanesque and the closely related styles which we usually class under the general term of Romanesque.

The plates are excerpts from the ponderous work published by the Spanish Government for the purpose of making a record of all the fine old examples of architecture in Spain, and issued under the title "Monumentos Arquitectónicos de España." Of the original work seven large volumes of beautifully engraved plates were issued; then the work was discontinued and these volumes are practically unobtainable. The reproduction of these fine hand engravings in the present work was a tour de force in photo-engraving. While the plates showing general views of the buildings have been reduced in reproducing them, a large number of details have been shown at the full size of the original drawings, making it possible to study them satisfactorily. There is an excellent introduction by John V. Van Pelt, in which he refers to the use of the Romanesque of Richardson, and to the splendid Bowery Bank Building by York & Sawyer.

The many decorative details shown should make the book of value to the designer as well as to the architect.

HOUSES AND GARDENS. Second Book of Houses Which Contains Over Five Hundred Illustrations of the Exteriors, Decoration, and Landscaping of Four Ideal Smaller Houses, Forty-eight Pages Showing How a House is Built, and a Portfolio of Over Sixty Small and Large Houses with Plans, Summer Camps, and Garages. Edited by Richardson Wright, Editor of *House and Garden*. The Condé Nast Publications, Inc., New York.

The houses shown in this collection are admirably selected, and the pictures of various details are all worth having. It is a book for the architect and a good book for the layman looking for just the kind of house he wants. The many illustrations make it a pictorial reference library on about everything concerning the house beautiful and comfortable.

TWENTY LITHOGRAPHS OF OLD PARIS. By Samuel Chamberlain. Limited to 100 signed copies. Printed in Paris on a fine French hand-made paper. Size 13 x 20. With a natural linen cover. William Helburn, 418 Madison Avenue, New York.

Mr. Chamberlain's drawings are familiar to all readers of Architecture, and the fact that he has turned some of his time to the fascinating mediums of lithography and etching will be no surprise to his admirers. He knows his Paris, evidently, and has chosen his subjects with excellent judgment. Few mediums offer more opportunity to the sympathetic draftsman than the lithographic crayon, and Mr. Chamberlain shows in these beautiful prints that he loves his work and finds therein an especial appeal to his sense of the picturesque. He knows how to make the rich, velvety blocks count and, as in his etchings, he has learned the art of wise omissions and the value of suggestion.

These prints should appeal with special emphasis to the collector.

The John J. Glessner house, home of the Architects' Club of Chicago. H. H. Richardson, Architect.

The Architects' Club of Chicago

PLANS for the securing of a suitable home for the club were the result of a dinner chat. During the discussion it was suggested that the well-known John J. Glessner house, located at the southwest corner of 18th and Prairie Avenues, would be an ideal building to house the architectural profession in Chicago. The house has long been recognized by the profession as an outstanding example of H. H. Richardson's genius.

President Fox, of the Illinois Society of Architects, offered to President Granger, of the Chicago Chapter, a solution of the problem by suggesting that the architects ask Mr. Glessner to provide in his will that the architects should have the first opportunity to purchase his house.

Mr. Glessner was genuinely pleased that the A. I. A. should want to preserve his house and told Mr. Granger that he would discuss it with his family, etc., with the outcome that he shortly afterwards advised President Granger that he was prepared to give his home to the Chicago Chapter, A. I. A.; the property to go to the chapter at his death or prior to his death should he give up using it as a residence.

Mr. Glessner, however, made one of the conditions of his gift that until his death or during the time when he should continue to occupy his own home the architects must secure and occupy as their headquarters the Kimball house, located directly across Prairie Avenue from his home.

The securing and occupancy of the Kimball house, which was made mandatory by the Glessner legacy, appeared to be too great an undertaking for the Chicago Chapter, A. I. A., to undertake alone, and the Illinois Society of Architects was invited by the chapter to co-operate in the undertaking.

Committees were appointed to represent the two organizations and were given power to act; the Chicago Chapter, A. I. A., being represented by President Alfred Granger, George C. Nimmons, and Richard E. Schmidt; the Illinois Society of Architects by President Charles E. Fox, F. E. Davidson, and J. C. Llewellyn.

The joint committee examined in detail both properties under consideration, and after several meetings and the most mature consideration, developed a plan whereby it was possible to secure by purchase the Kimball property, and thus make it possible for the architects of Chicago to secure by gift the wonderful treasure, the Glessner home.

The only feasible plan suggested was the formation of a club to own and occupy the Kimball residence. The general plan of organization of the club as suggested by President Fox and approved by the joint committee was referred to the two architectural organizations and was approved, and the committee instructed to proceed with the organization of the club.

The Kimball house. S. S. Beman, Architect.

At this time it was suggested that the club which has for years been known as the Chicago Architectural Club be taken into the organization, and upon the invitation of both the chapter and the society the Chicago Architectural Club joined in the movement.

It was also agreed, by the terms of a contract approved by the three organizations and signed by their executive officers, that the Illinois Society of Architects and the Chicago Architectural Club shall share with the Chicago Chapter, A. I. A., in all of the privileges and benefits to be derived from the Glessner gift; the other societies sharing with the chapter in the maintenance and operation of the building. The title of the Glessner home, however, will be vested in the Chicago Chapter, A. I. A., which was one of the conditions of the Glessner gift.

The plan of organization as adopted provided for four classes of membership:

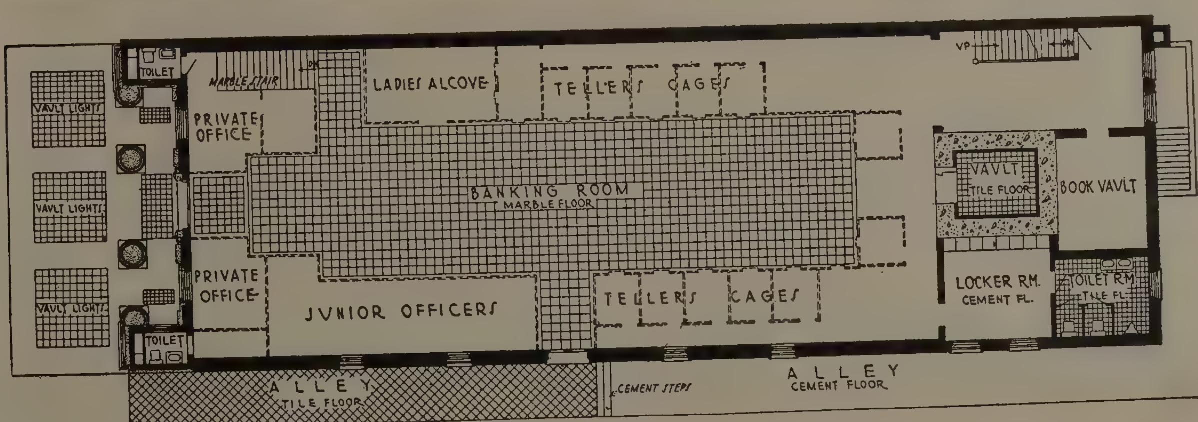
First: Proprietary members.
Second: Regular members.
Third: Non-resident members.
Fourth: Honorary members.

The proprietary members to be limited to 100 in number and each proprietary member to subscribe $1,000 and to receive 7 per cent interest on the funds so subscribed; the proceeds of the sale of proprietary memberships to be used for the purchase of the property and the making of necessary repairs to the building to adapt it to club purposes.

The proprietary members are to pay no initiation fee, but are to pay the regular yearly dues that regular members pay. Regular members are to pay an initiation fee of $100 each and yearly dues of $50.

It might be noted at this point that the plan of organization as adopted by the three organizations provided that every member in good standing in either of the three organizations was by that fact eligible for membership in the new club, and that the professional members of the club shall be members of either one of the three professional organizations and that ceasing to be a member of one of the three organizations shall operate as a resignation from the club. In this way it is hoped to strengthen the three parent organizations and to make membership in the club more desirable.

It was suggested that the club could be greatly strengthened by admitting to membership the leading representatives of the various contracting organizations, the representatives of the material interests, leading bankers, representatives of the metropolitan press and others who are connected either directly or indirectly with the building industry, and the drive committee invited some twenty of the leading representatives of the various contracting and building material organizations to a luncheon, at which time the plan was discussed and was approved by every representative of the contracting and material interests attending the luncheon.



FOURTH NATIONAL BANK, MONTGOMERY, ALA.

Okel & Cooper, Architects.

BANKING ROOM.

Okel & Cooper, Architects.

FOURTH NATIONAL BANK, MONTGOMERY, ALA.

The Romance of Building

By Richard P. Wallis

SECOND ARTICLE

THE problem of obtaining a suitable cementatiousagent to bond together these blocks of masonry, or, as the Irishman sagely remarked, "to keep thim apart," was not so readily solved, and the cautious experiments of our early masons in compounding a suitable medium for this purpose afford an interesting commentary on man's slow but successful endeavor to wrest from nature that knowledge that alone makes possible all human advancement. Man has long been aware of the peculiar adhesive property of calcareous materials. This knowledge extends back probably to a period beginning some five centuries before the dawn of the Christian era. The pyramid-builders of the Egyptians utilized a gypsum binder made by lightly burning the crude gypsum rock of which the pyramids are composed. This cement proved entirely adequate in a mild and equable climate such as that of ancient Egypt, but in localities of more rigorous temperatures would be of but little value.

The Romans in the execution of their building projects utilized a powdered lime to which was added a silicious material of volcanic origin taken from Pozzuoli, at the foot of Vesuvius. To this binder, as a consequence, was given the name of Puzzolanic cement. To-day blast-furnace slag is substituted for the volcanic ash of the Romans in the preparation of the modern replica of this particular variety of cement. The hydraulic properties of this early cement made possible the great aqueducts—the scattered ruins of which to-day delineate the limits of the ancient Roman Empire. The works of Pliny and Vitruvius abound with references to the use of this material in the execution of the private and public works of the time.

Upon the decline of the Roman Empire this cement fell into disuse, and in time the secrets of its manufacture became lost. During the dark days of the Middle Ages little advance was made in the manufacture and use of cementing material. It was not until 1756 that the efforts of John Smeaton, in seeking a suitable binder for use in connection with the rebuilding of the Eddystone Lighthouse, reawakened an interest in the problem of securing a better cementatious medium. From then on an intelligent attempt was made to master the problem, and the names of Parker, Dobbs, Pasley, Vicat, Frost, Smeaton, and Aspdin stand out as mile-posts in the development of this art.

These earlier cements were what is technically known as natural cement and were produced by burning, at a low temperature, certain impure limestone—the impurities consisting of clays in varying proportions. The resulting product, when mixed with water, produced a cementing material better than anything hitherto produced. Its obvious defects were lack of uniformity, due to the crude methods employed in its manufacture and the natural variation in proportion of clay and lime existing in different deposits of cement rock.

The Portland cement of to-day is but the logical development of these early experiments. A scientifically proportioned mixture of clay and lime burned to the point of incipient fusion produces a hard clinker which when ground to a nearly impalpable powder represents the Portland cement in such common use at the present time.

It was at Leeds, England, in May, 1824—a hundred years ago—that the bricklayer Aspdin, after various experiments in burning lime dust taken from the highways, found that the clinker, hitherto discarded, resulting from subjecting the raw ingredients to a higher temperature than was up to that time considered good practice contained when ground and mixed with water certain properties that produced a cement harder and more durable than any of the natural cements then in use.

This new material was christened "Portland Cement," owing to a fancied resemblance in color it bore to the building stone, then much in favor, quarried on the Isle of Portland, off the southern coast of England.

It was not, however, until well into the second quarter

A typical brick plant.

Typical scene in terra-cotta shop.

of the nineteenth century that the practice of burning this mixture to the point of incipient fusion, one of the distinguishing features of a true Portland cement as differentiated from a natural cement, became definitely established.

In America the first cement produced was in 1818, for use in the Erie Canal. This was a natural cement obtained from a rock found near Chittenango, New York. As the advantages of cement became better appreciated, suitable rock deposits of more or less varying compositions became available in widely scattered portions of the country. The peak of production of natural cement was reached in 1899, when 9,868,119 barrels were manufactured.

Portland cement was not manufactured in this country until the early seventies. As its advantages over natural cement became better understood its manufacture and use rapidly increased at the expense of the former. The year 1923 witnessed a production of 137,000,000 barrels of Portland cement, or the equivalent of a daily production of 375,000 barrels—an output greater than the production for the entire year of 1890.

The early methods of production were comparatively simple in their nature. The natural cement-rock was broken into small bits and placed in upright kilns of limited capacity, alternating with the layers of wood and coal used as fuel. After firing, the clinkers were withdrawn from the bottom of the kiln and ground between burr-stones operated sometimes by water-power and sometimes by windmills. The more or less finely pulverized product of these burr-stones was in turn successively screened until the desired degree of fineness was obtained.

These early natural cements were, as one might expect, extremely unreliable, owing to the variations in the composition of the natural cement-rock and to the crude and unscientific methods employed in their manufacture.

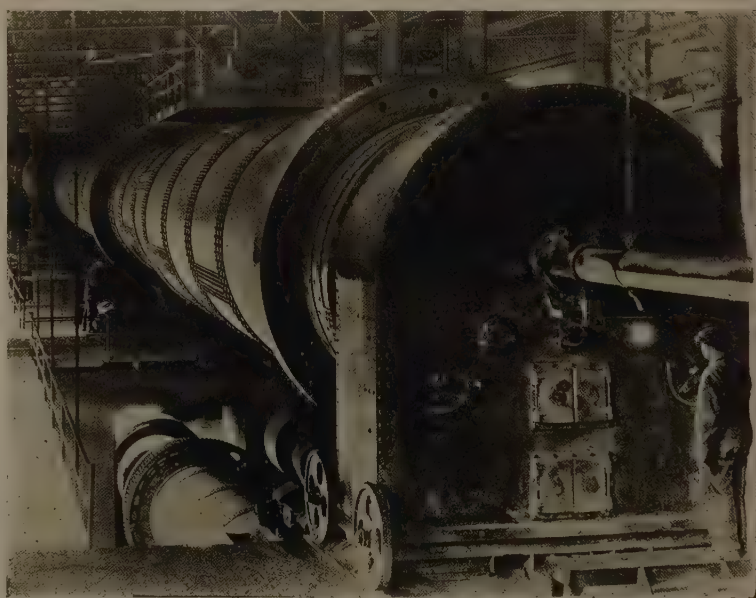
The manufacturing processes of the present day are in principle essentially those of our forefathers. In order, however, to meet the demands of the building public for a standard article it has become necessary to introduce a definite scientific proportioning of the raw ingredients and a substitution of modern equipment for the obsolete machinery of a generation or so ago.

Fortunately the necessary raw ingredients—calcareous matter, such as limestone, marl, chalk, and alkali waste, and argillaceous matter, such as clay, slate, shale, and blast-furnace slag—are accessible in practically unlimited quantities throughout the length and breadth of the country.

The process of converting this earthy matter into utilitarian form commences with the quarrying of the raw materials as found in natural deposits. Great ledges of limestone are blasted into bits and the fragments reduced by the nut-cracker action of the huge gyratory crushers to a size averaging six inches or less in diameter. This coarsely pulverized product is still further reduced in fineness by subjecting it to the impact of rapidly revolving beaters contained in the so-called hammer mill. The granulated rock is then stored in large bins. During this time steam-shovels have been busily engaged in building up stocks of argillaceous matter from the neighboring clay banks.

In case the so-called "dry process" is to be followed in the manufacture of the cement the materials are passed through huge rotary dryers to remove as much as possible of the contained moisture. In case the "wet process" is adopted, water is added to the crushed rock during the process of grinding to form a slurry; otherwise the two methods are practically identical.

From the dryers the rock is conveyed to the blending-bins, the contents of which are sampled and recorded hourly



Cement clinker being formed inside this modern rotary kiln at a temperature of from 2,500 to 3,000 degrees Fahrenheit.

A modern Portland cement plant. The manufacture of cement in a plant like this is a continuous process.

so that a proper mixture of limestone and clay may be effected.

The fine grinding of the raw material is accomplished generally in two stages: first, in a ball mill, consisting of a short cylinder filled with steel balls, and then in a tube mill, a longer cylinder carrying fifty tons or more of steel balls, flint pebbles, or other grinding medium.

From the raw mix storage the proper proportions of lime and clay are fed to the kilns. These rotary kilns are generally 10 feet or more in diameter and range in length from 100 feet to 200 feet or even more. These rotating cylinders are lined with fire brick and are slightly tilted, so that the charge of raw materials works its way through under the impetus of gravity. An intense heat, maintained at a temperature of from 2500° to 3000° F., at the discharge end is produced in the kiln by burning finely pulverized coal injected under air pressure. This great heat promotes a chemical combination of the lime and clay particles, resulting in the formation of greenish-black Portland cement clinker.

After cooling, a small amount of gypsum is added to the clinker to insure a setting time limit compatible with field requirements.

The grinding of the clinker, like that of the raw materials, is accomplished in two stages—first in a centrifugal mill and later in a tube mill, similar to that above described.

This final grinding reduces the clinker to a fineness such that at least 78 per cent of the product will pass through a sieve having 40,000 meshes to the square inch.

This process of manufacture has been aptly described as that of passing a mountain through a silk handkerchief. With this accomplishment already achieved, can one longer doubt the ability of man to set at naught the ancient Biblical injunction of passing a camel through the eye of a needle!

The finely ground Portland cement is then automatically weighed and packed in cloth and paper sacks ready for shipment to the distributors.

It is estimated that during the year 1923 the cement plants of the United States used over 15,000,000 pounds of dynamite in blasting out the 33,000,000 tons of rock utilized in the process of cement manufacture. Over 10,500,000 tons of coal, 4,700,000 pounds of fuel oil, and 4,000,000,000 cubic feet of gas were consumed during this period in the various cement plants. Replacements amounting to 320 miles of belting and 4,500,000 fire brick are necessary to compensate for the normal wear and tear on plant equipment over a period of a year. Sufficient grease to lubricate 93,000 taxicabs and enough lubricating oil to keep 46,000 additional cabs in running order for a period of a year are required annually to keep in suitable working order the machinery incidental to the manufacture of cement.

There are to-day over 225,000,000 cloth sacks in use, of which 60,000,000 are lost or destroyed annually. To make good this loss necessitates a strip of cloth 34,000 miles long and 30 inches in width, requiring some 25,000,000 pounds of cotton for that purpose. Over 46,000 miles of wire alone are required yearly to tie the sacks that contain this magic cementatious agent.

These figures dazzle the imagination with their very vastness, but when one considers that in the year 1923 the consumption of Portland cement in the United States alone amounted to approximately 450,000 barrels per working day, or 45,000 barrels per working hour, 750 barrels per working minute, or 12 barrels per working second, it becomes evident that these figures but reflect the tremendous growth of this lusty infant industry.

The quantity production of a reliable cement has revolutionized the building industry. Portland cement when combined with fine aggregate, such as sand, produces an incomparable mortar for brick, stone, and terra cotta masonry. Combined with sand and coarser aggregate, such as crushed rock or crushed slag, a synthetic building stone is produced, limited in size only by the whims and fancies of the engineer or architect. The addition of steel reinforcement permits of subjecting this artificial stone to tensile stresses and makes possible the great structural members of concrete so universally employed by the structural engineer of to-day in the solution of his problems.

We live in a new stone age, where plastic stone, composed of cement and aggregates, is moulded into forms to suit our convenience. We have concrete buildings, bridges, retaining-walls, tanks, freight-cars, fence posts, walks, drives, silos, harbor works, canals, dams, statuary, and so on. Its possibilities are limitless, and as our engineers press onward in their quest for knowledge we may confidently look forward to a time when fire-proof concrete will replace combustible wood in the construction of those edifices essential to us in our daily walks of life.

Medusa Portland Cement, manufactured near Sandusky, of material found in the great limestone deposits of that district, was used exclusively in connection with the mortar and concrete entering into the construction of the Cleveland Library.

A special cement known as "Saylor's Reground," having a fineness such that from 95 to 97 per cent will pass the standard 200-mesh sieve, was used for setting the sidewalk light over the first floor workrooms. This fine-ground cement (standard cement passes only 78 per cent through the 200-mesh sieve) makes possible a water-proof homeogeneous concrete mass, highly essential in good sidewalk light construction, but uneconomical for general use in building construction.

This special cement is manufactured at Coplay, Pa., the birthplace of the Portland cement industry in America, in the great Lehigh cement district, and takes its name from David O. Saylor, the father of the Portland cement industry in this country.

· FIRST · FLOOR · PLAN ·

· SECOND · FLOOR · PLAN ·

SKETCH FOR RESIDENCE. Royal Barry Wills, Architect.

Hollow Tile Walls Given Fire Test

Double Shell Tile Makes Good; Plaster Also Proves Aid to Fire Protection in Bureau of Standards Tests

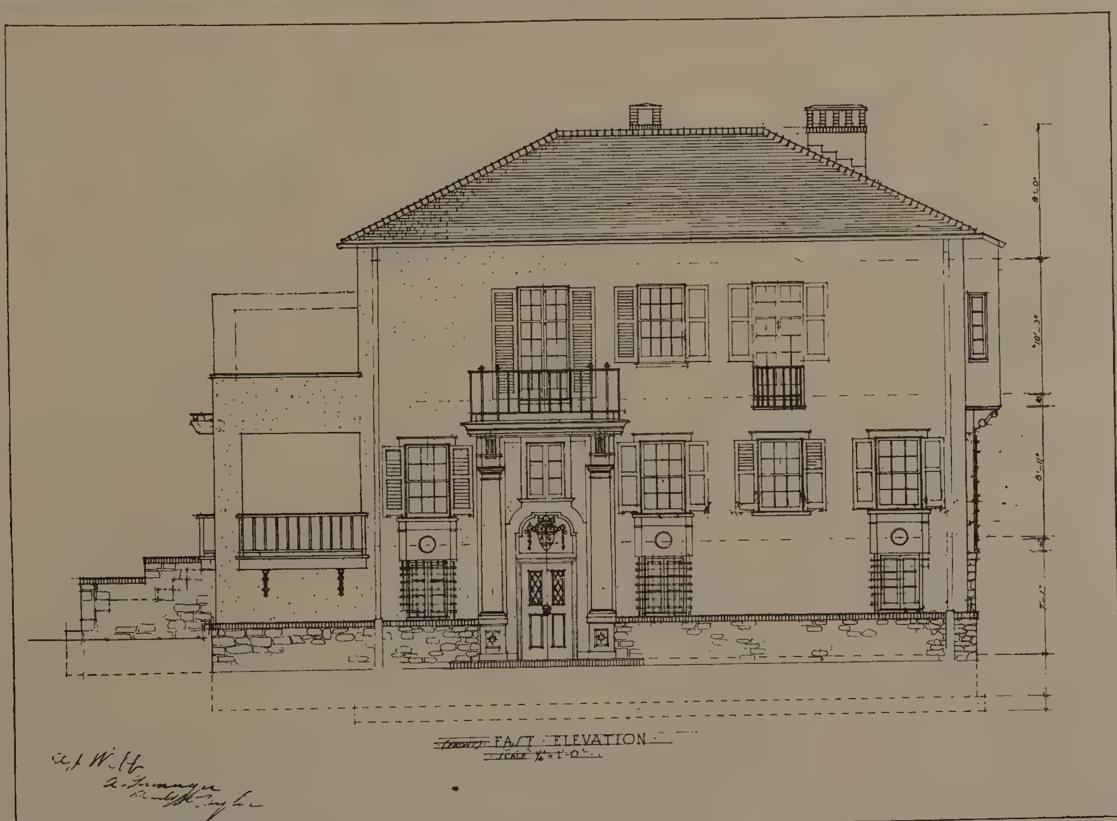
HOLLOW building tile having double shells on the two exposed sides give very good results from the point of view of fire protection, the Bureau of Standards finds. The exposed shell serves as a protection for the rest of the tile, and in order to distribute the stresses properly, the webs connecting this outer shell with the inner wall of the tile should be thinner, or less in number, than the webs back of the inner wall.

Gypsum and Portland cement plaster coatings over hollow tile will stay in place during ordinary fire exposure, and will give about the same protection from fire as the addition of one wall and cell to the thickness of the tile.

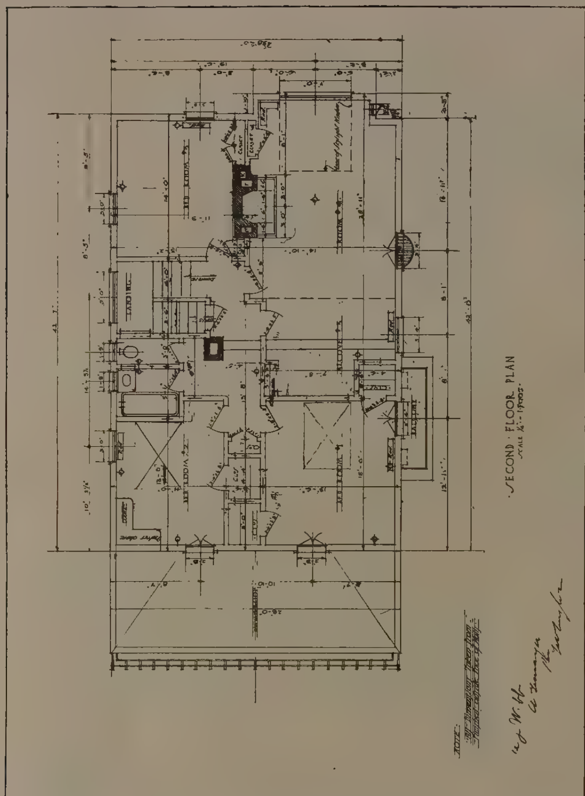
The addition of a combustible filler, such as sawdust, to the clay in amounts from 5 to 15 per cent by volume, decreases the cracking of the burnt tile when exposed to fire, but has the disadvantage of producing a decrease in strength for the larger amounts of filler, thus lessening the ability of the tile to carry load under fire exposure.

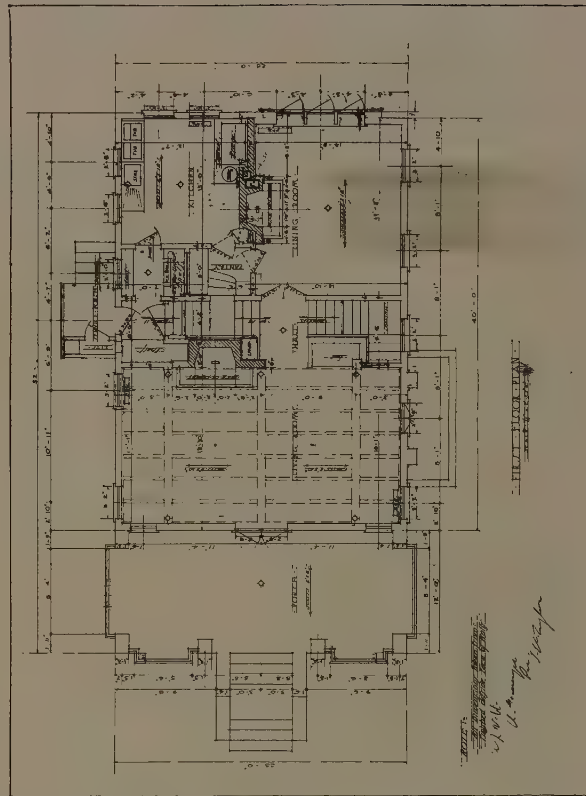
More than one hundred tests of small tile panels have been made, the panels forming one side of a special furnace. Eight tests have been made on walls eleven by sixteen feet, and these are the first of a series of fifty fire tests to be conducted on hollow tile walls in the near future. Some of these walls will be tested restrained by the heavy panel frame, as they would be if supported by cross walls during an actual fire. Others will be unrestrained, being supported only at the bottom. In some of the tests the walls will carry their normal working load.

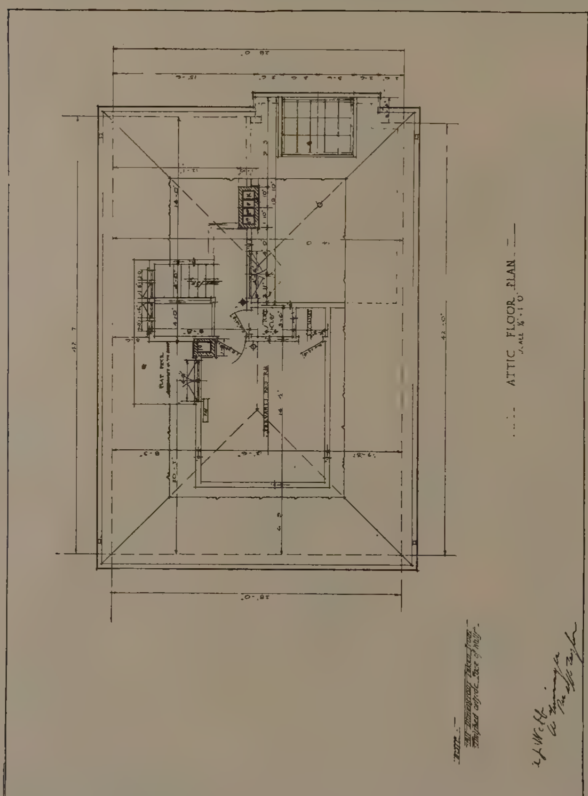
Other points found to add to the quality of tile are sufficiently fine grinding of the raw material, the even burning of the clay to normal hardness for that particular clay, the provision of sufficiently heavy shells and webs, and the use of ample fillets where the webs join the shell.

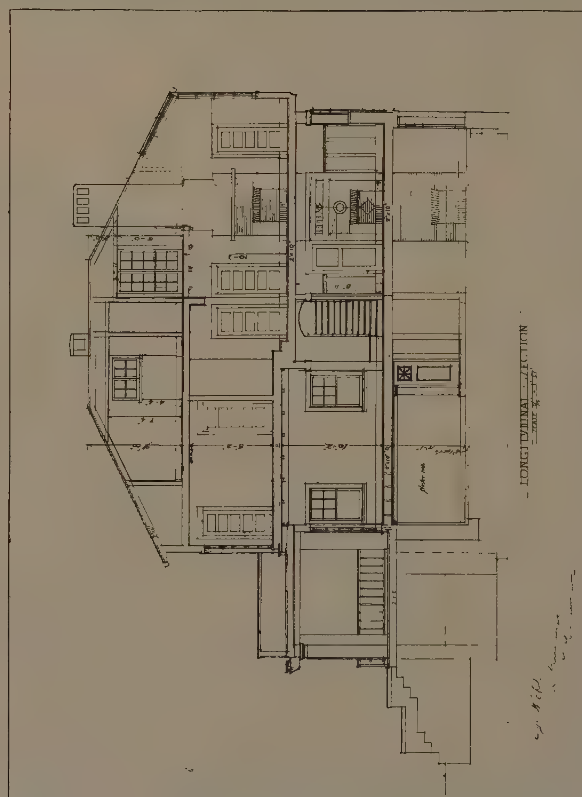


HOUSE, ALEXANDER GRINAGER, TUCKAHOE, N. Y. John H. Phillips, Architect.





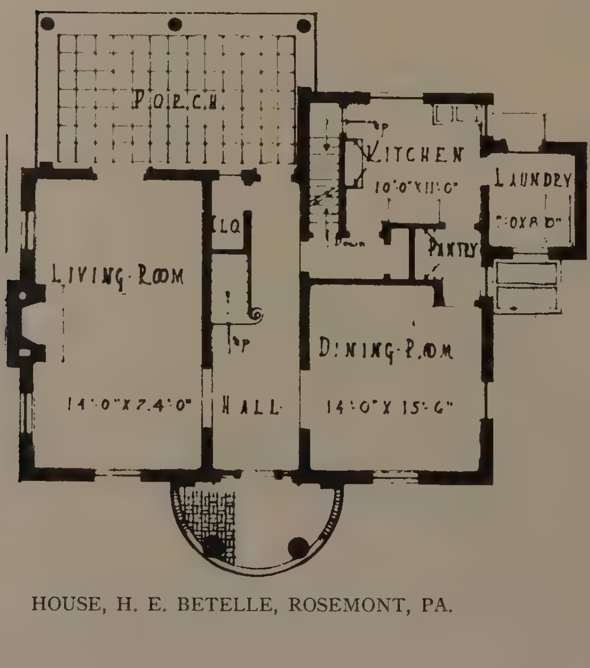




HOUSE, ALEXANDER GRINAGER, TUCKAHOE, N. Y.

John H. Phillips, Architect.

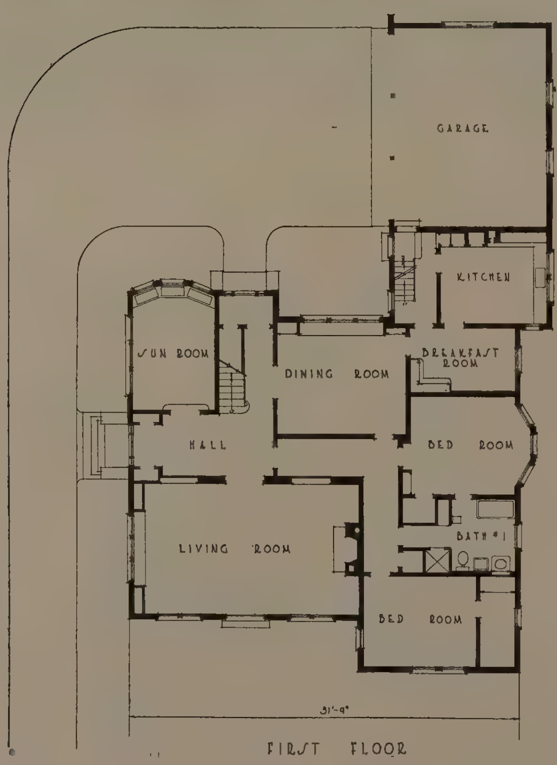
HOUSE AT ST. DAVIDS, PA. NOTE.—Plans are here reversed. Wallace & Warner, Architects.

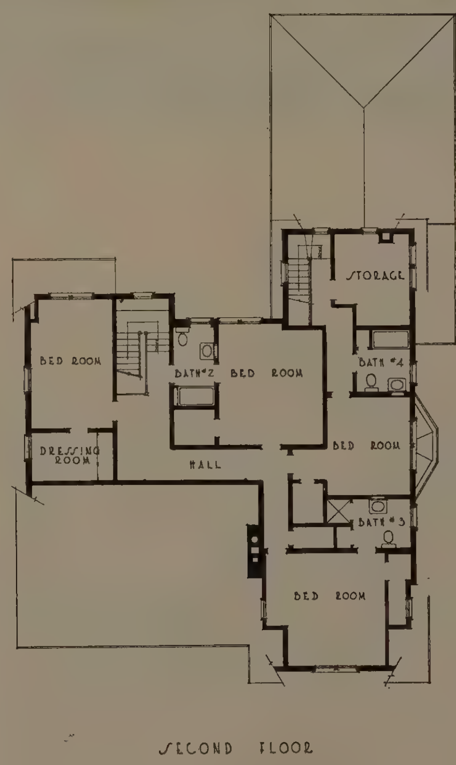


HOUSE, H. E. BETELLE, ROSEMONT, PA. Wallace & Warner, Architects.

HOUSE, ALBERT SHORT, DREXEL PARK, PA.

Wallace & Warner, Architects.





RESIDENCE FOR O. B. ILES, INDIANAPOLIS, IND. C. T. Myers, Architect.

An Architect's Simple Engineering Problems

By DeWitt Clinton Pond, M.A.

TENTH ARTICLE

IN the previous articles different types of floor construction have been gone into very thoroughly, and the reader should be able to design almost any kind of floor for ordinary structures by means of information given in them. Nothing, however, has been said of supports for floors such as walls, columns, and piers.

Under ordinary circumstances the supports for floors are the walls of the building and piers or columns in the interior. Skeleton construction, in which the exterior walls do not carry the floor construction but are actually carried themselves upon spandrel beams, is a method of building that has reached its greatest development during the last few years, but which is confined to the larger buildings. When skeleton frames are used the engineering problems encountered in the design are numerous and complicated, and an engineer's experience is necessary for design. However, great numbers of buildings are of a more modest type, and often the question of deciding upon the thickness of walls or piers of the sizes of columns is no difficult matter, and the architect need not call upon an engineer for aid.

Ever since the beginning of civilization men have used walls to carry the roofs under which they sheltered themselves. It is probable that all early methods of deciding upon the thickness of the walls were arrived at through experience, and no one will ever know of the failures of walls and lives lost due to early attempts to construct the equivalent of modern speculative construction. Even to-day the thickness of masonry walls is based upon good practice—arrived at through experience—rather than upon scientific experiments or calculations.

Very little need be said with regard to frame construction, for except in very rare cases floor loads in this type of building are so small that there is very little danger of failure due to lack of strength in the walls.

With regard to masonry walls, the thickness of these are usually specified in the building codes of the cities which have adopted building regulations. The architect or engineer who is familiar with the requirements of the codes of such cities as New York, Chicago, Cleveland, San Francisco, or cities of this type, are often astonished to find that there are many smaller communities with no codes at all. In such cases it is customary to fall back on the code of the nearest large city. As a rule there is very little difference between the requirements of the various ordinances, and the practices with regard to the thickness of masonry walls are largely standardized.

The New York Code is one that covers conditions in a manner that is characteristic of most of the others. In this code most of the conditions that are imposed upon masonry walls are provided for. The fact that the thicknesses are determined largely as a result of satisfactory experiences accounts for the walls of residence buildings being classified as different from those of public or business buildings. For long spans or unusual heights additional thicknesses are provided. The reasons for such classifications are obvious. Residences have lighter floor loads than business or public buildings, and where a long span exists between walls the loads at each end of the floor beams are naturally increased, requiring more substantial supports.

According to the New York Code the walls of small residential buildings may be 8 inches thick, provided such buildings are not more than 40 feet in height and the 8-inch walls do not exceed 50 feet in length between cross walls or adequate buttresses. As most houses do not exceed these dimensions, it is possible to use 8-inch walls in almost any type of country residences under such a ruling.

In residential buildings of a larger type, such as apartment-houses, when over 75 feet in height the walls must be 12 inches thick for the uppermost 25 feet, 16 inches for the next lower 35 feet, 20 inches for the next lower 40 feet, with a 4-inch increase for each additional lower section of 40 feet.

If buildings of this type are not over 75 feet in height the thickness of the masonry walls must be 12 inches for the uppermost 55 feet and 16 inches below that. The wall thicknesses given are carried to the nearest tier of beams to the heights specified. This makes it possible for a builder of an apartment-house 60 feet high to use 12-inch wall for all stories above the foundation walls. Foundation walls are required to be 4 inches thicker than the wall above them, so such walls would be 16 inches thick in any case.

In public or business buildings the thickness of brick walls is increased. For buildings 75 feet in height the uppermost 25 feet must be 16 inches thick, the next lower 35 feet must be 24 inches, and the thickness is increased 4 inches for every additional 40 feet.

When public or business buildings are over 60 feet but not over 75 feet in height, the uppermost 50 feet of wall must be 16 inches thick and 20 inches below that, and when over 40 feet but under 60 feet in height, the uppermost 20 feet of wall may be 12 inches thick and 16 inches thick below.

When buildings of this type are not over 40 feet high the walls may be 12 inches thick throughout.

These rules apply to brick walls of the ordinary type, and may be considered as minimum requirements. If stone walls are used, or ashlar facing, or if there are a large number of openings in the walls, or other conditions are encountered, as stated below, then the wall thickness must be increased.

It might be well to note that in accordance with the New York Code, walls of hollow building-blocks cannot be used as bearing walls in buildings over 40 feet high, but that the inside 4 inches of walls may be built of hand-burnt hollow brick of the same size or dimensions of ordinary brick. Furring blocks on the inside of masonry walls cannot be included in the measurement of the thickness of such walls.

In the ordinary brick-masonry walls the thicknesses given above must be increased if the clear span between bearing walls is over 26 feet, and 4 inches must be added to the wall thickness for every $12\frac{1}{2}$ feet or part thereof that the span exceeds this dimension.

To-day almost all walls are laid up in cement mortar, and under such conditions it is not necessary to make a masonry wall thicker on account of openings in it due to windows or flues, unless such openings reduce the horizontal area of the wall by 45 per cent. If the reduction exceeds 45 per cent, then 4 inches must be added for every 15 per cent or fraction thereof lost in the wall area due to such openings. If walls are laid in lime mortar, then the reduction in area cannot exceed 30 per cent, unless the thickness is increased, as stated above.

If walls are more than 105 feet long between cross walls or buttresses, they must be made 4 inches thicker for every 105 feet or part thereof it exceeds this length.

From what has been stated above it can be seen that if a wall is unusually long, or if there are many windows in it, or if the distance between it and the adjacent bearing wall is long, then it must be increased in thickness, but there is a provision in the Code stating that in case any wall is increased in thickness in accordance with one of the requirements given above, it will not be necessary to further increase the thickness unless, in the opinion of the superintendent of buildings, the safety of the wall demands it.

Ashlar can be included in the thickness of a masonry bearing wall provided it is laid up with alternate courses 8 inches thick, but a mere facing of face brick or 4-inch ashlar tied to the wall by clips cannot be considered in such thickness.

Masonry walls of brick as supporting walls must be of the thicknesses given. It can be seen that there is nothing scientific about the determination of the thicknesses. Ordinary engineering practice, as will be shown in later articles, requires that such determination is made upon the basis of first finding the loads, which rest upon the supports, and then developing the design of the columns or piers on the basis of the strength of the materials out of which they are made. However, it is probable that there can be no other method of developing wall thicknesses that would be of practical use.

Rubble walls must conform to still further limitations, as such walls, except for foundations, cannot be used in buildings over 60 feet in height. Walls built of rubble stone must have a thickness of 4 inches more than given above for the minimum requirements of masonry walls, and in no case can they be less than 18 inches in thickness.

Masonry piers are designed so that the proportion between the least dimension and height must be 1 to 10. In other words, a pier 10 feet high must have a least dimension of 1 foot.

Such thicknesses as are given above are subject to revision if there is any doubt about the stresses developed in the walls or piers due to the loads that must be supported. In a previous article the safe carrying capacity of brickwork laid in cement mortar was given as 250 pounds per square inch, and so, if there were any question as to whether a wall were strong enough to carry a given load, the area over which the load is carried could be found and this multiplied by the allowable stress. If the result is smaller than required to support the girder or floor load, the area of the supporting wall must be increased either by adding to its thickness or spreading the load by means of steel beams or plates laid along the wall.

This was taken up partially in a previous article in which plates were placed under beams that were framed into masonry walls. In some cases, often in school construction, plates are not sufficient, and steel grillages are used to support the ends of girders spanning across auditoriums or gymnasiums.

This design or a grillage of this type will be taken up in the next article. There is nothing particularly difficult about such work, as the problem consists of dividing the load by the allowable stress and by this method determining the area over which the load must be spread. If the wall is of a predetermined thickness, then the length which must be covered by grillage-beams is easily found by dividing the area by the thickness. The beams that cover this area act as cantilevers, with uniform loads pressing upward rather than downward. There is nothing new in such calculations. However, there are some cases where the loads at the ends of girders are great enough to cause failure through crushing. In this case the web thickness must be of such dimensions that the area of steel coming directly under the girder end will be great enough to support the load. In some cases it is necessary to use channels placed back to back in much the same manner as found in grillages under columns.

Walls as supports are usually not carried above six stories in height. When buildings are higher, then columns are used in the exterior walls to carry floor loads in the same manner as they are used in the interior of almost all buildings. In such cases the exterior walls become "curtain walls," carrying only their own weight. They may be 12 inches thick for the uppermost 60 feet of their height, increasing 4 inches in thickness for each next lower section of 60 feet.

In some cases, where it is desirable to be as economical in the use of steel as possible, walls are regarded as curtain walls for 60 feet of their height, and are carried on the steel frame-work above this height. In any case, the walls need not be more than 12 inches thick, and throughout the lower portion their weight is not carried by the steel.

Another Small-House Competition

McCALL'S MAGAZINE announces a programme for a small house, which challenges the ingenuity and resourcefulness of the designer.

The keynote is precedent, that is, proper precedent for a small house. It is not to be a mosaic of antique features, but a thoroughly modern house, in which has been inculcated the spirit of the old work in so simple a manner as to be readily recognizable, yet altogether reasonable in the light of modern improvements and use of materials.

The house must be a really *small* one, the cubage being restricted to 18,000 cubic feet.

The solution must be practical and the house buildable. The requirements and limitations in the programme have been carefully drafted with the object of securing this result.

Awards.—The author of the design placed first will receive a cash prize of $1,000. The second prize will be $500. The jury of award will also select a few designs which may be considered worthy of honorable mention.

Drawings Required.—1. Perspective and floor plans. A brief article justifying the selection of the particular precedent used and its application and calling attention to any special features. 2. Working drawings and specifications for use in construction.

Jury of Award.—The following architects have been engaged to assist in the conduct of this competition and they will comprise the jury of award: Alexander B. Trowbridge, New York; Edwin H. Brown, Minneapolis; John Russell Pope, New York.

The Problem.—A six-room house for a 50 by 100 foot improved inside lot of specified frontage; particular attention to be given to orientation.

Requirements.—The competition is educational in character—educational, not for the architect who is supposed to know, but for the laymen, on whom are continually foisted plans and houses of inferior character.

The competition closes October 31, 1925.

Drawings shall be delivered to Miss Marcia Mead, Consulting Architect to *McCall's Magazine*, 236 West 37th Street, New York, N. Y.

All architects and draftsmen of the United States are invited to participate in this competition.

Programmes may be secured from Miss Mead.

American Construction Council on Better Building

"ONE very serious situation confronting the country requires special attention. A large percentage of present-day building construction throughout the country is distinctly inferior in quality and unsound in financing. Thousands of such structures now under way or recently erected, especially in housing, are subject to such rapid deterioration that within ten years' time, sometimes less, they will be practically valueless. This rapid depreciation, coupled with unsound methods of promotion, must entail enormous loss on the principal investment, besides entailing serious expense and heavy additional burdens for repairs and maintenance after a few years. A still further burden is added by the higher rates of insurance due to the use of inferior materials and poor construction. All these make for higher rents.

"This situation results from the activities of irresponsible groups found in every element of the industry. Faulty engineering, unreliable architects, inexperienced and incompetent contractors, inferior grades of materials, poor mechanics, inadequate and poor inspection, and other bad factors too frequently enter into building work. These have serious effects but no more serious than unsound financing. Mortgage bonds are issued and on speculative buildings. Many such issues are based on improper security and fictitious statements of earnings at abnormal interest rates. They find buyers because of the general ignorance existing in many quarters as to the requirements for good real estate securities. Such purchasers are usually those who can least afford to be victimized. Every element of the industry must bear its proportionate share of the blame for the vicious practices not infrequently found in building projects to-day, and for permitting practices within its ranks that do not measure up to proper standards.

"To further the interests of the business of building and a general adoption of the principles of better building the Council has appointed a special and fully representative committee of men vitally interested in the desirable ends to be gained. This committee will make a survey of conditions and recommend correctives where deemed necessary.

"The Council's programme for the training of apprentices and the development of improved craftsmanship in the building trades is calculated to benefit greatly this situation. Apprenticeship is a national question and cannot be solved merely by treatment in isolated spots without regard to the other sections of the country and national needs as such. The American Construction Council, as the national body representative of all elements in the construction industry and the public and co-operating with the various localities and branches of the industry, thus has in its apprenticeship work a most effective means for furthering the principle of better building in addition to other desirable ends to be gained through apprentice training.

"The foregoing measures, combined with the Council's help in reducing the seasonal variations in building operations with their bad effects on quality of construction, particularly during the rush periods of the year, and its assistance in the promotion of organizations in the different localities of the country by bringing together the various elements of the industry in these sections as a part of its national movement to promote responsibility and intelligent co-operation in all of their aspects, furnish the basis for securing very practical results to industry generally and the public."

Starved Glue Joints

MANY failures in glued-up wood are caused by "starved" joints, or joints in which the film of glue between the wood surfaces is not continuous. Such joints, according to the Forest Products Laboratory, Madison, Wis., are not necessarily the result of a lack of glue spread on the wood; heavy spreads are as likely to produce them under ordinary commercial conditions as light spreads. They are caused rather by the application of pressure to the joint while the glue is too fluid.

Starved joints are more likely to occur with glues of low viscosity, such as warm animal glue and most blood albumin glues, than with casein, vegetable, and other thick glues.

Some woods are more susceptible to the production of starved joints than others. Birch, maple, red oak, and ash, which have open pores, absorb glue from the spread in such considerable amounts that they often leave the joints starved.

About the American Institute of Architects

WE have received an attractively printed folder, "Manual of the American Institute of Architects," that contains information concerning the purposes, requirements for membership, and plans for the development of this admirable organization. The institute is a power for good in advancing the best interests of the profession. The executive offices are in the famous Octagon in Washington, designed by William Thornton, 1761–1828.

Announcements

Charles Sheres, architect, announces that he is now located at 70 East 45th Street, Room 2613, New York.

The firm of Whinston and Hurwitz has been dissolved as of September 1, 1924. Mr. B. H. Whinston will open new offices at 6 East 46th Street, New York City. Manufacturers' samples and catalogues are requested.

G. A. Pehrson, Architect, Spokane, Wash., announces the removal of his office to 308 Spokane and Eastern Trust Building.

Andrew J. Sauer & Co., Architects and Engineers, announce the removal of their offices to the Schaff Building, northwest corner 15th and Race Streets, Philadelphia. They are organized to provide professional skill necessary for the development of any complex problems in the construction of buildings and complete equipment.

These are the days of great gifts to colleges for building, and certainly our collegiate architecture as represented by recent work at Yale, Princeton, the University of Michigan, Northwestern University, and other famous seats of learning may be looked upon as worthy contributions to the culture they are helping to spread abroad. James Gamble Rogers, the master builder of the Harkness Memorial at Yale, is the architect of the new buildings for Northwestern. With him will be associated hereafter the well-known Chicago firm of Childs & Smith, whose admirable work we have had the privilege of publishing a number of times.

Kansas City Life Insurance Co., Kansas City, Mo. Wight & Wight, Architects. Permanent floors of *Gold Seal* Battleship Linoleum installed by Bonded Floors Co.

A definite guarantee of permanent linoleum floors

A few architects who use Bonded Floors service

Alfred C. Bossom
Cass Gilbert
Albert Kahn
McKim, Mead & White
Meade & Hamilton
Kenneth Murchison
John Russell Pope
Starrett & Van Vleck
Stevens & Lee
Walker & Gillette
York & Sawyer

It is not enough, nowadays, to provide quiet, foot-comfort and harmony in selecting floors for banks, business establishments, public buildings, etc. Your clients rightly consider the resilient floors as much a part of their permanent investment as the roofs and ceilings; and, as such expect durability—permanence.

A Bonded Floor of *Gold-Seal* Battleship Linoleum meets this most important requirement as satisfactorily as it does all others. Definite pledge of durability—built in by skilled workmanship and the use of only highest quality materials—is the Surety Bond. This Bond against repair expense is assurance of long and satisfactory service, and is obtainable with any Bonded Floor installed according to our specifications.

The architect's responsibility ends when he writes into the specifications that a Bonded Floor of *Gold Seal* Battleship Linoleum is to be installed—the owner to receive the Surety Bond, issued by the U. S. Fidelity and Guaranty Company.

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From the drawing by M. A. Spencer.